Issued April 1969

SOIL SURVEY

Barren County, Kentucky

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
KENTUCKY AGRICULTURAL EXPERIMENT STATION

Major fieldwork for this soil survey was done in the period 1959–66. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in this publication refer to conditions in the county in 1965–66. This survey was made cooperatively by the Soil Conservation Service and the Kentucky Agricultural Experiment Station; it is part of the technical assistance furnished to the Barren County Soil Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Barren County contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in appraising the value of tracts of land for agriculture, industry, or recreation.

Locating Soils

All of the soils of Barren County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside, and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the county in alphabetic order by map symbol. It shows the page where each kind of soil is described, and also the page for the capability unit and woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Translucent material can be used as an overlay on the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and woodland groups.

Foresters and others can refer to the section "Use and Management of the Soils for Wood Crops," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others concerned with wildlife will find information about soils and wildlife in the section "Use of the Soils for Wildlife Habitats."

Community planners and others concerned with suburban development can read about the soil properties that affect the choice of homesites, industrial sites, schools, and parks in the section "Use of the Soils for Nonfarm and Recreational Developments."

Engineers and builders will find, under "Engineering Applications," tables that give engineering descriptions of the soils in the county and that name soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Barren County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the Area," which gives additional information about the county.

Cover picture
Tobacco on a Crider silt loam.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

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SOIL SURVEY OF BARREN COUNTY, KENTUCKY

BY EARLE E. LATHAM, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY EARLE E. LATHAM, ARLIN J. BARTON, RONALD D. FROEDGE, AND JAMES W. DYE, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE KENTUCKY AGRICULTURAL EXPERIMENT STATION

BARREN COUNTY is in the south-central part of Kentucky (fig. 1). It has an area of approximately 486 square miles. Glasgow is the county seat. The county is bounded on the north by Hart County and on the east by Metcalfe County. Edmonson and Warren Counties lie to the west, and the southern parts are bounded by Allen and Monroe Counties.

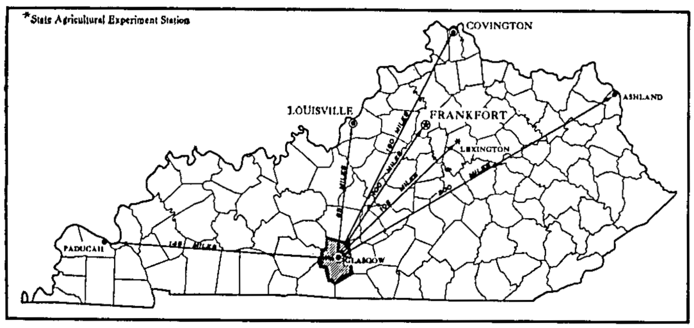

Figure 1.—Location of Barren County in Kentucky.

The county lies in the eastern and western Pennyroyal physiographic regions of Kentucky, a part of the Mississippian Plateau (*10*).[1] The central and southern parts have gently rolling to steep soils and many perennial streams and tree-shaded pastures. The northern fifth of the county has predominantly rolling to steep soils; it is a karst area having many rounded, steep sinks and bowl-like depressions. An irregularly shaped tract, called the slash area, has gently undulating to sloping soils and many small intermittent drainageways. This area extends from the vicinity of Merry Oaks, Bon Ayr, and Stovall to southwest of Goodnight and along the Metcalfe County boundary line, east of Hiseville. The northwestern tip of the county is near Mammoth Cave. It is characterized by narrow, sink-dotted valleys and side slopes that rise up to gently sloping to sloping ridgetops. The soils in this area range from level to steep.

Agriculture has been important in Barren County since the first settlers came. Corn, small grains, and burley tobacco were the most important crops at one time. In recent years, however, the trend has been toward growing burley tobacco and grass. The climate of the county is generally temperate and humid. There are only short periods of excessive heat and cold. Rainfall is fairly evenly distributed. Late summer and early fall are generally the driest seasons, and spring is generally the wettest season. Frost is not a severe hazard to field crops and pastures in the county. The growing season is favorable for the production of grasses and legumes.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Barren County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soil or soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or for other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The five soil associations in Barren County are described in the following pages.

1. Weikert-Caneyville-Wellston-Zanesville association

Shallow and moderately deep, well to somewhat excessively drained, sloping to steep, rocky or stony soils on hillsides and deep, well drained to moderately well drained, gently sloping to sloping loamy soils on ridgetops

This association is in the northwestern corner of the county, a part known as the Mammoth Cave area. It has steep side slopes, moderately broad to narrow ridgetops, and sink-dotted valleys (fig. 2). Underground streams drain the area. Elevations range from about 630 to about 970 feet. The association makes up about 3 percent of the survey area.

Weikert soils make up about 24 percent of this association. They are shallow to bedrock and are generally moderately steep to steep. Caneyville soils, which are well drained, moderately deep, and very rocky, make up about 23 percent of the association. They are sloping to moderately steep and occupy valleylike positions below the Weikert soils. Wellston soils make up about 14 percent of the association. They are sloping, deep, and well drained

[1] Italic numbers in parentheses refer to Literature Cited, page 83.

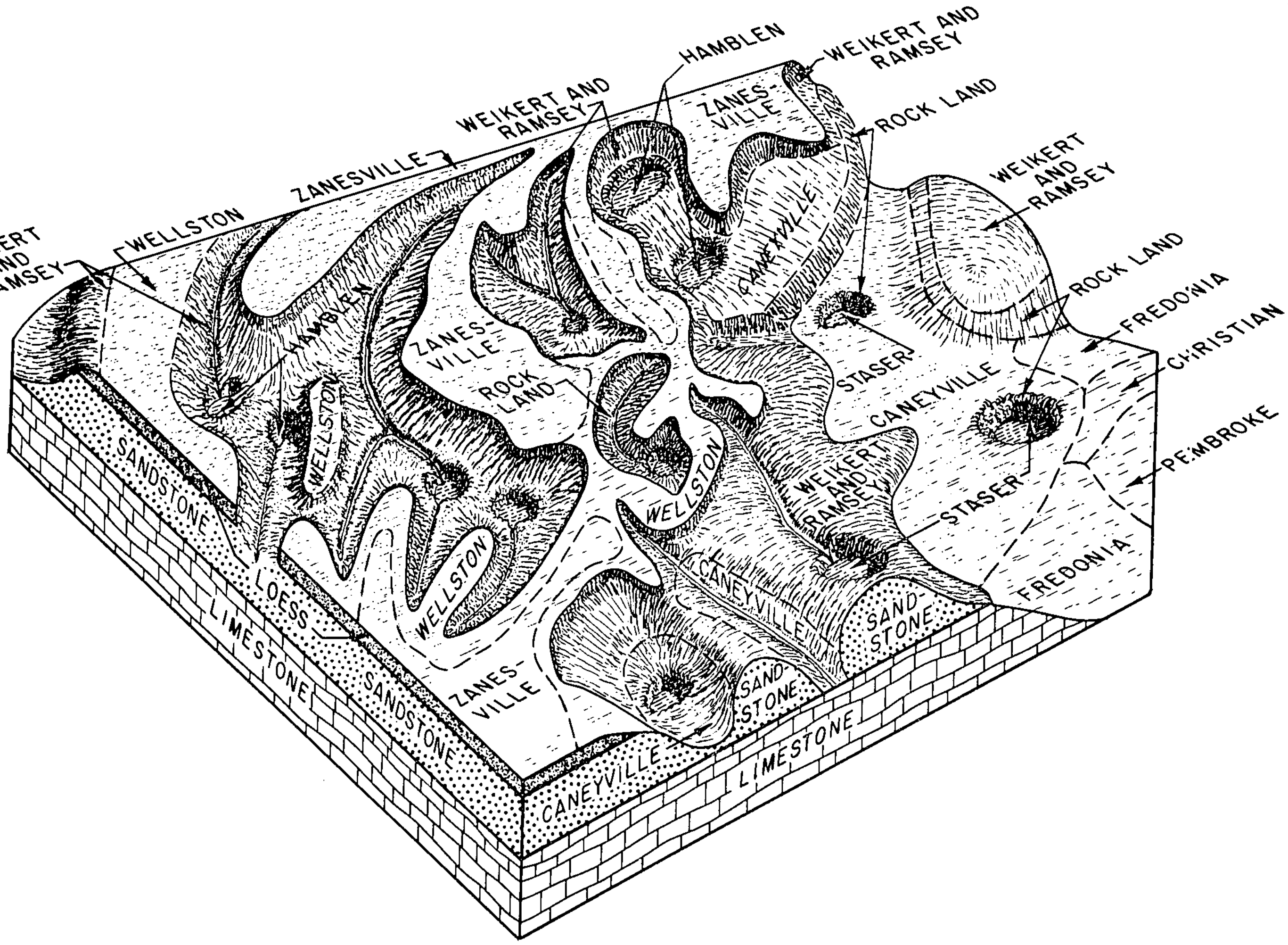

Figure 2.—**Diagram of the Weikert-Caneyville-Wellston-Zanesville association showing relationship of soil series to topography and underlying material.**

and occur on ridges. Zanesville soils make up about 13 percent of the association. They occupy ridgetops, are gently sloping, and are moderately well drained.

The land type Rock land and soils of the Fredonia, Ramsey, Hamblen, Christian, Pembroke, and Staser series make up the rest of the association and are of minor extent.

Steep slopes, stones, and rocks are the chief limitations of soils in this association. Approximately 1,336 acres of the association lie within the Mammoth Cave National Park. More than 60 percent of the association is in woods of low commercial value. Most of the farms average about 100 acres in size; a few are considerably larger.

Ordinarily, only a small part of each farm is suitable for cultivation, and the total value of farm products sold is rather low. Most of this association has low potential for crops and pasture.

2. *Cumberland-Pembroke association*

Deep, well-drained, gently sloping to strongly sloping clayey or loamy soils of the limestone uplands

This association occurs in the northern part of the county. It is a karst area having moderately broad to narrow ridges and intervening bowl-shaped sinks or depressions (fig. 3). Drainage is mostly through underground streams. The association makes up about 19 percent of the survey area.

Cumberland soils, chiefly gently to strongly sloping and deep, make up about 66 percent of this association. Pembroke soils, which are well drained, fertile, and, for the most part, gently sloping, make up about 12 percent.

Most of the remaining 22 percent of the association is made up of Crider, Christian, Staser, Nolichucky, Baxter, and Fredonia soils; of Rock land in the uplands; and of Hamblen soils on the flood plains and in upland depressions.

More than 90 percent of this association is used for corn, alfalfa, tobacco, small grain, hay, and pasture. Eroded soils and chert are limitations to farming. A few 1- to 10-acre hardwood stands are in this area. They occur mostly on knobs or around large sinks. Most of the farms average about 100 acres in size; a few are much larger. Most of the farms are operated by their owners, but a few are operated by tenants.

Most of the acreage of gently sloping to strongly sloping soils is suitable for cultivation when managed properly.

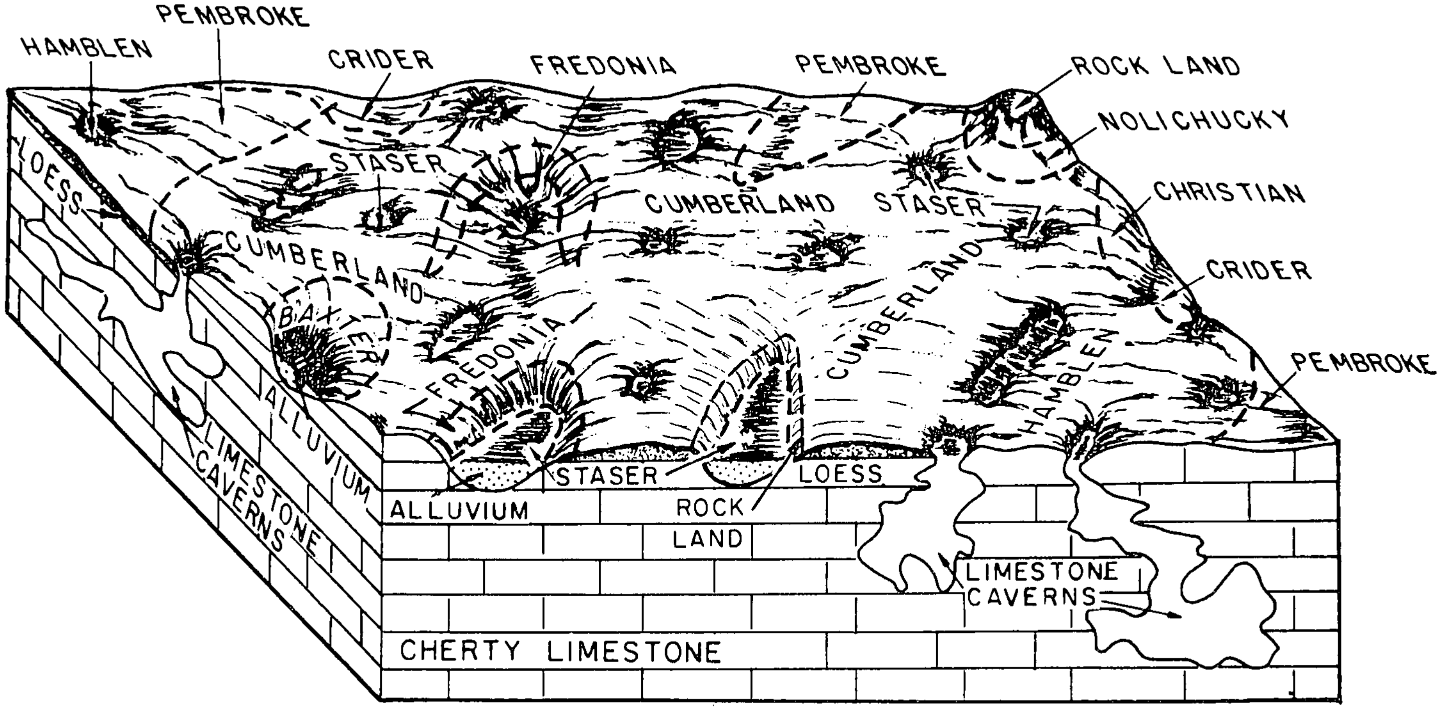

Figure 3.—**Diagram of the Cumberland-Pembroke association showing relationship of soil series to topography and underlying material.**

This association surpasses the other four associations in the total value of farm products. The association is suited to the production of all crops that are grown locally.

3. *Dickson-Melvin-Crider association*

Dominantly moderately deep, moderately well drained, gently sloping silty soils of the uplands and poorly drained, nearly level silty soils on flood plains

This association occurs in narrow strips from Merry Oaks to the vicinity of Goodnight and along the Metcalfe County boundary line east of Hiseville. It is commonly referred to as the slash area. It consists of moderately broad to narrow ridges and depressed areas (fig. 4). Several intermittent streams begin in this association. The association makes up about 5 percent of the survey area.

Dickson soils make up about 40 percent of this association. They are dominantly gently sloping, are moderately well drained, and are moderately deep to a fragipan. Melvin soils make up about 18 percent of the association. They are poorly drained, nearly level soils of the flood plains and large upland depressions. Crider soils make up about 16 percent. They are well-drained, gently sloping to sloping soils on ridges.

Mountview, Taft, and Sango soils on uplands and Newark and Hamblen soils on flood plains make up most of the remaining 26 percent of the association.

More than 60 percent of this association is used for corn, tobacco, small grain, alfalfa, hay, and pasture. The poorly drained areas, some of which are 40 acres or more in size, are mostly wooded. Most of the farms average about 90 acres in size; a few are considerably larger. Most of the farms are operated by their owners, but a few are operated by tenants.

The total value of farm products sold is moderate. The association is suited to the production of timber and pasture.

4. *Baxter-Talbott-Dickson association*

Deep, well drained, gently sloping to moderately steep, dominantly cherty soils with clayey subsoil, on uplands; and moderately deep, moderately well drained, gently sloping silty soils on ridgetops

This association extends from the Warren County boundary line in the west, near Railton, to the Metcalfe County line in the east, and along narrow ridges at Eighty Eight, Temple Hill, Lucas, Roseville, Austin, and Tracy. It is made up of broad and narrow ridges and predominantly short side slopes (fig. 5). In some places karst topography is dominant. Several permanent streams pass through the area. Along these are strips of alluvial soils ranging from about 300 to 1,300 feet in width. The association makes up about 38 percent of the survey area.

Baxter soils, which are cherty or very rocky, make up about 30 percent of this association. They occupy ridges and are gently sloping to moderately steep. Rock outcrops are common in some areas of these soils. Talbott soils make up about 16 percent of the association. They occupy ridges, are gently to strongly sloping, and have a plastic, clayey subsoil. Dickson soils make up about 12 percent. They occupy ridgetops, are gently sloping, are moderately well drained, and have a fragipan in the subsoil.

Crider, Morganfield, Christian, Mountview, Sango, Hamblen, Tarklin, Needmore, Humphreys, Clarksville, Bodine, Garmon, Taft, and Newark soils make up most of the remaining 42 percent of this association.

Erosion and chertiness are the dominant limitations of the soils of this association for farming. About 85 percent

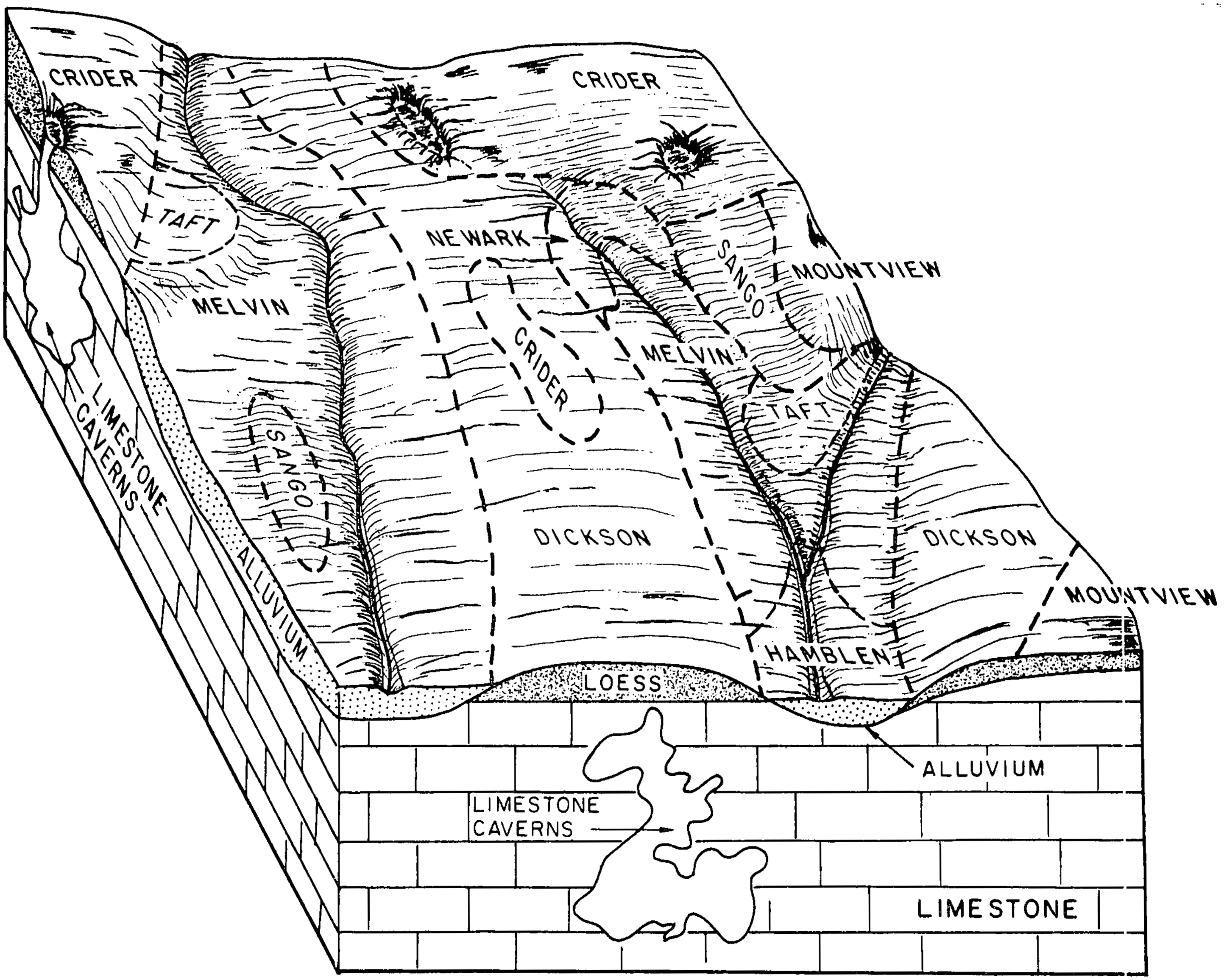

Figure 4.—**Diagram of the Dickson-Melvin-Crider association showing relationship of soil series to topography and underlying material.**

of the association is used for corn, tobacco, small grain, hay, and pasture. The steep soils on short side slopes are dominantly in hardwood trees. A few acres are in unimproved pasture. The farms average about 85 acres in size. Most are owner operated. A few are operated by tenants.

The total value of farm products is high. The association is suited to field crops, pasture, and timber.

5. *Clarksville-Bodine-Mountview association*

Dominantly deep, well drained to excessively drained, sloping to steep, cherty and very cherty silty soils on hillsides; and deep, well-drained, gently sloping to sloping silty soils on ridgetops

This association extends from the Barren River and Allen County in the west to Monroe County in the southeast and Metcalfe County in the east. It has the most deeply dissected topography in the county. It is made up predominantly of hillsides and moderately wide to narrow ridgetops (fig. 6). Most large tributaries of the Barren River drain this area. Flood plains in the association range from about 100 to 2,600 feet in width. Soils on bottoms along the Barren River are a part of this association, but they are mostly covered by water from the Barren Reservoir area and are not available for farming. The association makes up about 35 percent of the survey area.

Clarksville soils make up about 17 percent of this association. They are cherty and dominantly sloping to moderately steep. Bodine soils make up about 8 percent. They occupy side slopes and are excessively drained, have a very cherty subsoil, and are sloping to steep. Mountview soils make up about 6 percent. They are deep, well drained, and, for the most part, gently sloping.

Baxter, Humphreys, Dickson, Sango, Garmon, Crider, Talbott, Needmore, Tarklin, Morganfield, Hamblen, Taft, Melvin, Robinsonville, and Newark soils make up most of

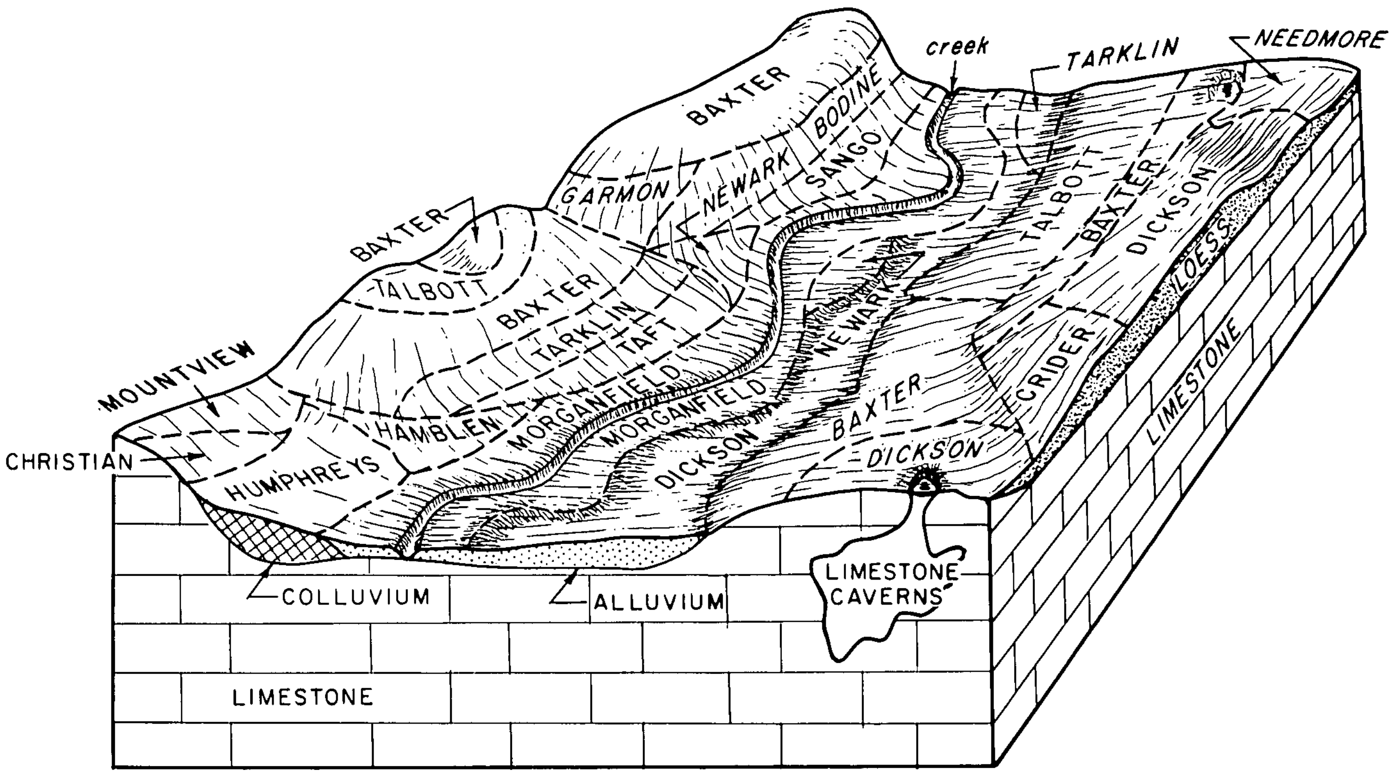

Figure 5.—Diagram of the Baxter-Talbott-Dickson association showing relationship of soil series to topography and underlying material.

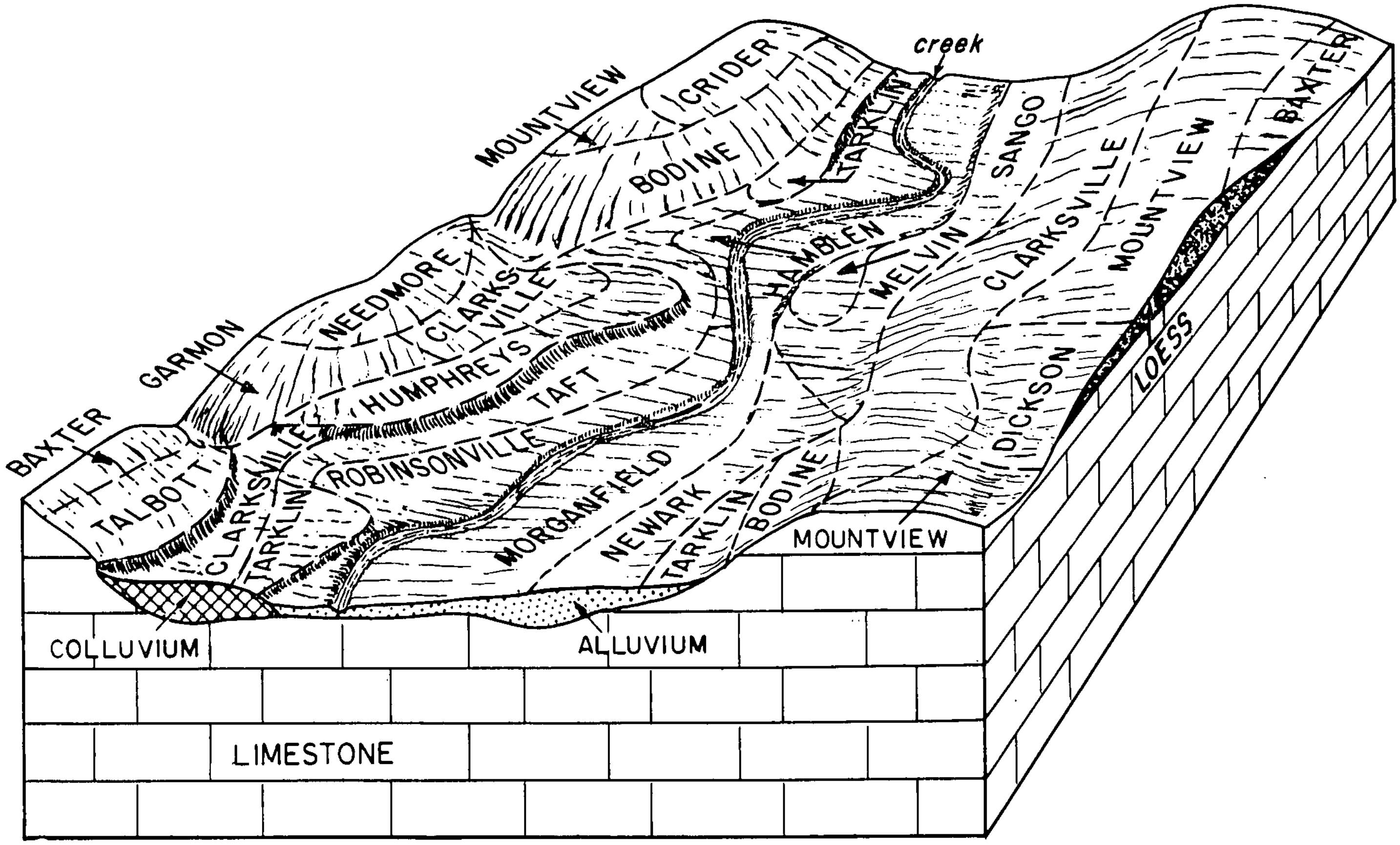

Figure 6.—Diagram of the Clarksville-Bodine-Mountview association showing relationship of soil series to topography and underlying material.

the rest of the association. Each makes up about 3 to 5 percent of the association.

Chertiness, droughtiness, and erosion are the dominant soil limitations in this association. More than 75 percent of the association is used for corn, small grain, tobacco, alfalfa, hay, and pasture. About 20 percent is wooded, and some of the larger trees are marketed, mainly for lumber. The alluvial soils in the association are important to farming, and nearly all are cultivated. Most farms in this association average about 85 acres in size; a few are considerably larger. Most of the farms are operated by their owners, but a few are operated by tenants.

The total value of farm products sold in this association is low to moderate in comparison with the value of farm products sold in most of the other associations in the county. The potential of this association for timber production is fair to good.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Barren County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they travelled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Baxter and Pembroke, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that are alike except for the texture of their surface layer. According to the differences in texture of the surface layer, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Pembroke silt loam and Pembroke silty clay loam are two soil types in the Pembroke series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Baxter cherty silt loams, 2 to 6 percent slopes, is one of several phases of Baxter cherty silt loam, a soil type that ranges from nearly level to moderately steep.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. They used aerial photographs for their base map because such photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this survey was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientist has the problem of delineating the different kinds of soils in areas where soil boundary lines are difficult to recognize because stoniness, rockiness, steepness, or all three are dominant over other soil characteristics. For such areas it is sometimes not practical to show the soils separately on a map, and the soil scientist may need to show them as one mapping unit, which he calls an undifferentiated unit. Ordinarily, an undifferentiated soil unit is named for the major soils in it. An example is Weikert and Ramsey stony soils.

In most mapping of soils, there are areas to be shown that are so rocky, so shallow, so frequently worked by water, or so disturbed by man that they cannot be classified by soil series. These areas are shown on a soil map as are other mapping units, but they are given descriptive names, such as Gullied land or Rock land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientists had named and described the soil series and mapping units and had shown the locations of the mapping units on the soil map. The mass of detailed recorded information then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands, developers of wildlife and recreation areas, engineers, builders, and planners of various uses of land. To do this efficiently, soil scientists consulted with persons in other fields of work and jointly prepared with them groupings, ratings, and classifications that would be of practical value to different users. Capability groupings are intended primarily for use by persons interested in farming. Woodland groupings are for those who need to manage wooded tracts. Engineering classifications are especially useful to engineers who build highways or structures to conserve soil and water. Ratings of the suitability of the soils for wildlife habitats, recreational uses, and other purposes make the survey helpful to additional users.

Descriptions of the Soils

This section provides fairly detailed information about the soils in Barren County. General information about the soils can be found in the section "General Soil Map," in

which broad patterns of the soils are described. Information on the "Formation and Classification of the Soils" can be found in the section bearing that heading.

In the pages that follow, the soil series and mapping units of the county are described in alphabetic order. A representative profile that is considered typical for the soils of a series is described in detail in the discussion of each series. In some mapping units the profile differs somewhat from the described representative profile for the soil series. The differences are evident in the name of the mapping unit or are pointed out in the description of the unit. The discussion of each soil series emphasizes characteristics common to most soils of that series. Unless otherwise indicated the colors given are those of a moist soil.

Use and suitability for farming are discussed in the description of each soil series and of each soil. Following the name of each soil is a symbol in parentheses that identifies the soil on the detailed soil map at the end of this publication.

The "Guide to Mapping Units," near the back of this publication, shows in what capability unit and woodland group each soil unit has been placed. This information is also given for each soil at the end of the soil description. Capability units are described in the section "Use and Management of the Soils for Crops and Pasture." Woodland groups are described in the section "Use and Management of the Soils for Wood Crops."

The descriptions of soil series and soils contain some technical terms because there are no nontechnical terms that convey precisely the same meanings. Many of these technical terms are defined in the Glossary.

The approximate acreage and the proportionate extent of each soil are given in table 1. The location of each soil is shown on the soil map at the end of this publication.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Baxter cherty silt loam, 2 to 6 percent slopes	5, 470	1. 8
Baxter cherty silt loam, 6 to 12 percent slopes, eroded	21, 180	6. 8
Baxter cherty silt loam, 12 to 20 percent slopes, eroded	18, 560	6. 0
Baxter cherty silt loam, 20 to 30 percent slopes, eroded	5, 580	1. 8
Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded	2, 950	. 9
Baxter very rocky silt loam, 6 to 20 percent slopes, eroded	1, 190	. 4
Baxter very rocky silt loam, 20 to 30 percent slopes, eroded	2, 160	. 7
Bodine cherty silt loam, 6 to 12 percent slopes	2, 070	. 7
Bodine cherty silt loam, 12 to 20 percent slopes	2, 780	. 9
Bodine cherty silt loam, 20 to 35 percent slopes	5, 560	1. 8
Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded	1, 320	. 4
Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded	450	. 1
Christian cherty loam, 2 to 6 percent slopes	680	. 2
Christian cherty loam, 6 to 12 percent slopes, eroded	1, 380	. 4
Christian cherty loam, 12 to 20 percent slopes, eroded	1, 190	. 4
Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded	280	. 1
Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded	420	. 1
Christian silt loam, 2 to 6 percent slopes	2, 150	. 7
Christian silt loam, 6 to 12 percent slopes, eroded	3, 610	1. 2
Christian silty clay loam, 6 to 12 percent slopes, severely eroded	650	. 2
Clarksville cherty silt loam, 2 to 6 percent slopes	1, 950	. 6
Clarksville cherty silt loam, 6 to 12 percent slopes, eroded	10, 260	3. 3
Clarksville cherty silt loam, 12 to 20 percent slopes, eroded	6, 610	2. 1
Clarksville cherty silt loam, 20 to 30 percent slopes, eroded	1, 680	. 5
Crider silt loam, 2 to 6 percent slopes	11, 880	3. 8
Crider silt loam, 6 to 12 percent slopes, eroded	4, 840	1. 6
Cumberland cherty silt loam, 2 to 6 percent slopes, eroded	16, 990	5. 5
Cumberland cherty silt loam, 6 to 12 percent slopes, eroded	13, 760	4. 4
Cumberland cherty silt loam, 12 to 20 percent slopes, eroded	3, 390	1. 1
Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded	3, 240	1. 0
Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded	1, 700	. 5
Dickson silt loam, 0 to 2 percent slopes	880	. 3
Dickson silt loam, 2 to 6 percent slopes	21, 760	7. 0
Dickson silt loam, 6 to 12 percent slopes, eroded	4, 080	1. 3
Dowellton silt loam	670	. 2
Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded	2, 180	. 7
Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded	690	. 2
Garmon silt loam, 2 to 6 percent slopes	840	. 3
Garmon silt loam, 6 to 12 percent slopes, eroded	320	. 1
Garmon silt loam, 12 to 20 percent slopes	1, 400	. 5
Garmon silt loam, 20 to 35 percent slopes	4, 960	1. 6
Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded	900	. 3
Gullied land	560	. 2
Hamblen silt loam	4, 610	1. 5
Humphreys cherty silt loam, 2 to 6 percent slopes	1, 160	. 4
Humphreys cherty silt loam, 6 to 12 percent slopes, eroded	2, 700	. 9
Made land	430	. 1
Melvin silt loam	3, 370	1. 1
Morganfield silt loam	4, 970	1. 6
Mountview silt loam, 2 to 6 percent slopes	8, 060	2. 6
Mountview silt loam, 6 to 12 percent slopes, eroded	2, 470	. 8
Needmore silt loam, 2 to 6 percent slopes	1, 690	. 5
Needmore silty clay loam, 6 to 12 percent slopes, eroded	2, 270	. 7
Needmore silty clay, 6 to 12 percent slopes, severely eroded	350	. 1
Newark silt loam	4, 340	1. 4
Nolichucky fine sandy loam, 2 to 6 percent slopes	360	. 1
Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded	380	. 1
Pembroke silt loam, 2 to 6 percent slopes	5, 240	1. 7
Pembroke silt loam, 6 to 12 percent slopes, eroded	1, 820	. 6
Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded	610	. 2
Robinsonville gravelly silt loam	4, 390	1. 4
Rock land	3, 530	1. 1

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Roellen silty clay loam	110	(1)	Talbott silty clay loam, 6 to 12 percent slopes, eroded	540	.2
Sango silt loam, 0 to 2 percent slopes	880	.3	Tarklin cherty silt loam, 2 to 6 percent slopes	3,080	1.0
Sango silt loam, 2 to 6 percent slopes	5,040	1.6	Tarklin cherty silt loam, 6 to 12 percent slopes	2,300	.8
Staser silt loam	4,960	1.6	Weikert and Ramsey stony soils, 12 to 20 percent slopes	580	.2
Taft silt loam	4,580	1.5	Weikert and Ramsey stony soils, 20 to 50 percent slopes	1,940	.6
Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded	2,680	.9	Wellston silt loam, 6 to 12 percent slopes	1,020	.3
Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded	3,310	1.1	Zanesville silt loam, 2 to 6 percent slopes	1,050	.3
Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded	16,990	5.5	Subtotal	306,430	98.5
Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded	8,530	2.7	Water, Barren River Reservoir No. 2	4,610	1.5
Talbott silty clay loam, 2 to 6 percent slopes, eroded	920	.3	Total	311,040	100.0

[1] Less than 0.05 percent

Baxter Series

The Baxter series consists of cherty or rocky, well-drained soils that developed from cherty limestone.

The surface layer is very friable cherty silt loam. The upper subsoil is strong-brown or yellowish-red, firm cherty silty clay loam. There is a gradual transition to yellowish-red to red, firm to very firm cherty silty clay in the lower subsoil. Rock outcrops are common on some of the steeper slopes.

The root zone is deep to moderately deep. Moisture-supplying capacity is high to moderate, natural fertility is moderately high, and reaction is strongly acid. Permeability is moderate.

The Baxter soils are somewhat difficult to till because the plow layer contains chert fragments. If not severely eroded, they can be cultivated through a wide range of moisture content without clodding or crusting. Most of the acreage of these soils is used for row crops, hay, and pasture. A smaller part, consisting mostly of the steeper soils, is in woods.

Representative profile of Baxter cherty silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 4/3) cherty silt loam; weak, fine, granular structure; very friable; many roots; medium acid; clear, smooth boundary; 4 to 9 inches thick.

B1t—8 to 14 inches, strong-brown (7.5YR 5/6 to 5/8) cherty silty clay loam; moderate, fine and medium, subangular blocky structure; firm; few clay films; many roots; strongly acid; gradual, smooth boundary; 4 to 7 inches thick.

B21t—14 to 22 inches, yellowish-red (5YR 5/6) cherty heavy silty clay loam; strong, medium, angular blocky structure; firm, sticky, plastic; many clay films; strongly acid; gradual, smooth boundary; 5 to 10 inches thick.

B22t—22 to 40 inches, red (2.5YR 4/6 to 4/8) cherty silty clay; common, medium, distinct variegations of yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4); strong, medium, angular blocky structure; very firm, sticky, plastic; many clay films; strongly acid; gradual, wavy boundary; 8 to 20 inches thick.

B23t—40 to 52 inches, variegated red (2.5YR 4/6), light yellowish-brown (10YR 6/4), and brownish-yellow (10YR 6/8) cherty silty clay; moderate to strong, medium, angular blocky structure; firm, sticky, plastic; common clay films; strongly acid; gradual, wavy boundary; 4 to 16 inches thick.

C—52 to 72 inches +, primarily a chert bed with interstices filled with clay that is variegated red, yellowish red, yellowish brown, strong brown, and gray; firm, sticky, plastic; common clay films; strongly acid; about 1 to 4 feet thick.

Representative profile of Baxter very rocky silt loam, 6 to 20 percent slopes, eroded:

Ap—0 to 5 inches, yellowish-brown (10YR 5/4) cherty silt loam; weak, fine, granular structure; friable; common outcrops of limestone rock; medium acid; clear, smooth boundary; 6 to 8 inches thick.

B1t—5 to 14 inches, yellowish-red (5YR 4/6) cherty silty clay loam; moderate, medium, subangular blocky structure; firm; few clay films; medium acid; clear, smooth boundary; 4 to 10 inches thick.

B21t—14 to 18 inches, red (2.5YR 4/6) cherty silty clay; strong, medium, angular blocky structure; firm, sticky, plastic; common clay films; medium acid; gradual, wavy boundary; 3 to 8 inches thick.

B22t—18 to 25 inches, dark reddish-brown (2.5YR 3/4) cherty clay; strong, fine and medium, angular blocky structure; very firm, sticky, plastic; common clay films; strongly acid; gradual, wavy boundary; 6 to 14 inches thick.

B23t—25 to 30 inches, yellowish-red (5YR 4/6) cherty fine sandy clay; strong, fine and medium, angular blocky structure; firm, sticky, plastic; common clay films; strongly acid; gradual, wavy boundary; 4 to 10 inches thick.

R—30 inches +, limestone bedrock.

In some places the Ap horizon ranges to brown (10YR 5/3), dark grayish brown (10YR 4/2), or yellowish brown (10YR 5/4). The B horizon ranges from strong brown (7.5YR 5/6) and yellowish red (5YR 4/6) to red (2.5YR 4/6), except that in some places the lower part is dark red (2.5YR 3/6) and dark reddish brown (2.5YR 3/4). The B23t horizon is commonly variegated, but one color is dominant in some profiles.

The depth to limestone bedrock ranges from about 16 inches to 10 feet, but it is generally between 2½ feet and 10 feet in the Baxter cherty silt loams and between 16 and 48 inches in the Baxter very rocky silt loams. Rock outcrops are few to common in areas of rocky Baxter soils. The chert content of the A and B horizons of Baxter soils is about 15 to 40 percent, by volume.

The Baxter soils are associated with the Crider, Clarksville, Mountview, and Talbott soils, which are well drained, and with the Dickson and Sango soils, which are moderately well drained. They are redder and more clayey in the upper subsoil than the Clarksville, Crider, Dickson, Mountview, and Sango soils. They are less red and less clayey in the upper subsoil than the Talbott soils.

Baxter cherty silt loam, 2 to 6 percent slopes (BaB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies moderately wide ridges. The organic-matter content is medium.

Mapped with this soil are small areas that are slightly more eroded than this soil. In these inclusions the plow layer contains some subsoil material and is slightly less friable than the plow layer of this soil.

This Baxter soil is suitable for all crops grown in the county. There is a moderate hazard of erosion when it is cultivated. (Capability unit IIe-11; woodland group 1)

Baxter cherty silt loam, 6 to 12 percent slopes, eroded (BaC2).—This sloping soil has a profile similar to that described for the series. The plow layer, however, contains some subsoil material and is less friable and lighter colored. The organic-matter content of this soil is low.

Mapped with this soil are small areas that are less eroded than this soil. In these inclusions the surface layer is slightly thicker, more friable, and darker than the surface layer of this soil. Also included are a few small, galled areas where the subsoil is exposed.

This Baxter soil is suitable for growing all crops common to the area. There is a severe hazard of erosion when it is used for cultivated crops. (Capability unit IIIe-6; woodland group 1)

Baxter cherty silt loam, 12 to 20 percent slopes, eroded (BaD2).—This strongly sloping soil has a profile similar to that described for the series. It, however, has a surface layer that contains some subsoil material and is less friable and lighter colored than that in the described profile. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded than this soil. In these inclusions the surface layer is slightly thicker, more friable, and darker than the surface layer of this soil. Also included are a few small, galled areas where the subsoil is exposed.

Most of the crops common to the area will grow on this Baxter soil, but there is a very severe hazard of erosion when it is cultivated. Cultivated crops should be grown on it only occasionally. It is well suited to pasture and hay crops. In growing annual lespedeza, a grass should be included in the seeding. (Capability unit IVe-3; woodland group 1)

Baxter cherty silt loam, 20 to 30 percent slopes, eroded (BaE2).—This moderately steep soil has a profile similar to that described for the series. It has, however, a surface layer that contains some subsoil material and is less friable and lighter colored than the surface layer of the described profile. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded than this soil. The surface layer of these inclusions is slightly thicker, more friable, and darker than the surface layer of this soil. Also included are a few small, galled areas where the subsoil is exposed.

Because of its steepness and the risk of severe erosion, this Baxter soil is not suited to row crops. It is well suited to pasture and to other nonintensive uses. (Capability unit VIe-1; woodland group 1)

Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded (BcD3).—This strongly sloping, severely eroded soil has a profile similar to that described for the series. As a result of erosion and exposure of the subsoil, however, it has a surface layer of yellowish-red, firm cherty silty clay loam. There are numerous shallow gullies in some areas. The organic-matter content is very low.

Included with this soil in mapping are small areas that have slopes of 20 to 30 percent. Also included are small areas that have either a slightly redder, slightly more clayey upper subsoil, or a less red, slightly more clayey upper subsoil.

Because it has been so eroded, this Baxter soil is not suited to cultivation and should remain under protective cover. It is suited to growing pasture crops and to other nonintensive uses. Pasture and hay yields are fair. (Capability unit VIe-2; woodland group 3)

Baxter very rocky silt loam, 6 to 20 percent slopes, eroded (BeD2).—This sloping to strongly sloping soil has a profile shallower to bedrock and more clayey than that described for the series. Moreover, the upper subsoil is more clayey than that of the profile described for the series. This soil occupies narrow ridgetops and upper side slopes.

Rock outcrops cover about 10 to 15 percent of the surface in most areas of the soil. The depth to bedrock, in most places, is about 30 inches, but the range is from 16 to 48 inches.

The root zone is moderately deep. Moisture-supplying capacity is moderate, and organic-mater content is low.

Included with this soil in mapping are small areas that are severely eroded, some that are uneroded, and some that are relatively free of rock outcrops.

This Baxter soil can be worked throughout a wide range of moisture content without clodding and crusting. Rock outcrops and chert fragments interfere with the use of farm machinery. Rockiness makes this soil unsuited to row crops. With the exception of some wooded, moderately steep side slopes, most areas of this soil are used for pasture. The soil is well suited to growing trees and providing food and cover for wildlife. (Capability unit VIs-1; woodland group 8)

Baxter very rocky silt loam, 20 to 30 percent slopes, eroded (BeE2).—This soil has a profile like the one described for Baxter very rocky silt loam, 6 to 20 percent slopes, eroded. It has about the same range in depth to bedrock as that soil. This soil occupies side slopes and is moderately steep.

Mapped with this soil are small areas that are less eroded than this soil and that have a surface layer of brown, friable silt loam about 8 inches thick. Also included in mapping are small areas that have slopes of 12 to 30 percent from which practically all of the original surface soil has been removed by erosion. These eroded areas have a plow layer of reddish, firm silty clay loam.

Rockiness and steepness make this Baxter soil unsuitable for cultivated crops. This soil can produce short-season pasture, but it is excessively difficult to establish and maintain such pasture. This soil is best suited to growing trees and providing food and cover for wildlife. (Capability unit VIIs-2; woodland group 8)

Bodine Series

The Bodine series consists of excessively drained, sloping to steep, very strongly acid soils. These soils developed in strongly weathered, very cherty limestone.

These soils have a surface layer of brown, very friable cherty silt loam. The subsoil is yellowish-brown very cherty silt loam that grades to brownish-yellow very cherty silt loam underlying material. It is underlain by a bed of chert that has gray and brown light silty clay loam in the spaces between chert fragments.

The root zone is shallow to moderately deep. Moisture-supplying capacity and natural fertility are low. Reaction is very strongly acid. Permeability is moderately rapid to rapid.

The Bodine soils are somewhat difficult to till because of their high chert content and steep slopes, but they can be worked throughout a wide range of moisture content without clodding or crusting. Some areas of sloping and strongly sloping Bodine soils are used for row crops. Use of Bodine soils for pasture is common. Second-growth hardwoods are on many areas of the steeper soils.

Representative profile of Bodine cherty silt loam, 12 to 20 percent slopes:

Ap—0 to 6 inches, brown (10YR 5/3) cherty silt loam; weak, fine, granular structure; very friable; chert content about 25 percent, by volume; about 2 percent of the chert fragments are between 3 and 10 inches in diameter; common roots; medium acid; abrupt, smooth boundary; 5 to 8 inches thick.

B—6 to 15 inches, yellowish-brown (10YR 5/6) very cherty silt loam; few, fine, faint variegations of light yellowish brown (10YR 6/4) and very pale brown (10YR 7/3); weak, fine and medium, subangular blocky structure; friable to slightly firm; chert content about 55 percent, by volume; about 1 percent of the chert fragments are between 3 and 10 inches in diameter; very strongly acid; abrupt, smooth boundary; 6 to 12 inches thick.

C1—15 to 24 inches, brownish-yellow (10YR 6/6) very cherty silt loam; weak, fine and medium, subangular blocky structure or massive; friable; chert content about 70 percent, by volume; about 50 percent or more of the chert fragments are between 3 and 10 inches in diameter; very strongly acid; gradual, wavy boundary; 6 to 12 inches thick.

C2—24 to 43 inches, chert bed; interstices filled by light-gray (10YR 7/2) and light yellowish-brown (10YR 6/4) silt loam to light silty clay loam; massive; friable; chert content about 90 percent or more, by volume; about 50 percent of the chert fragments are between 3 and 10 inches in diameter; very strongly acid; clear, smooth boundary; about 1 to 3 feet thick.

R—43 inches +, cherty limestock bedrock.

The color of the A horizon ranges from dark grayish brown (10YR 4/2) to pale brown (10YR 6/3). The color of the B horizon ranges from yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) or strong brown (7.5YR 5/8).

The depth to the chert bed ranges from about 18 to 36 inches. The depth to bedrock ranges from 3 to 6 feet. The estimated chert content ranges from 20 to 75 percent in the upper part of the profile to about 50 to 90 percent in the lower part. The chert is flaggy in some locations and angular in others.

The Bodine soils are associated with the Clarksville, Baxter, and Mountview soils, which are well drained, and the Garmon soils, which are somewhat excessively drained. The Bodine soils have a less distinct B horizon and are coarser textured and more yellowish than the Clarksville, Baxter, and Mountview soils. Bodine soils formed in cherty material and have a cherty profile as a result. In this way they differ from the Garmon soils, which formed mainly in shaly limestone and calcareous shale.

Bodine cherty silt loam, 6 to 12 percent slopes (BoC).—This sloping soil has a profile like the one described for the series. It occupies ridges. The organic-matter content is low.

Included with this soil in mapping are small areas that have slopes of 2 to 6 percent. Also included are small areas where the surface layer is light yellowish-brown very cherty silt loam.

This Bodine soil is poorly suited to row crops because of low yields caused by droughtiness. Moreover, the chert interferes with cultivation. The soil is suited to pasture, the yields being fair. It is also suitable for growing trees and providing food and cover for wildlife. (Capability unit IVs–2; woodland group 4)

Bodine cherty silt loam, 12 to 20 percent slopes (BoD).—A profile of this soil was described as representative for the series. This soil is strongly sloping and occupies ridges. The organic-matter content is low.

Mapped with this soil are small areas where the surface layer is light yellowish-brown very cherty silt loam.

Yields are too low for economical production of row crops. The soil is more suitable for pasture or for growing trees and providing food and cover for wildlife. (Capability unit VIs–3; woodland group 4)

Bodine cherty silt loam, 20 to 35 percent slopes (BoE).—This soil is not so deep to the cherty layer, but otherwise its profile is like that described for the series. It is moderately steep to steep and occupies side slopes. The organic-matter content is low.

Included with this soil in mapping are small areas having slopes of 35 to 50 percent. Also included is a small acreage in which the surface layer is light yellowish-brown very cherty silt loam.

Because of its steepness and shallow root zone, this Bodine soil is poorly suited to use for field crops or pasture. It is suitable for growing trees and providing food and cover for wildlife. (Capability unit VIIs–1; woodland group 4)

Caneyville Series

The Caneyville series consists of well-drained, sloping to moderately steep soils of the uplands. These soils formed in material derived from limestone and sandstone and, in some places, partly in material from shale.

The surface layer is slightly firm, yellowish-brown silty clay loam where these soils are moderately eroded. It is firm silty clay where they are severely eroded. The upper subsoil is dark-brown, firm silty clay or heavy silty clay loam. There is a gradual transition to strong-brown, very firm silty clay in the lower subsoil. Outcrops of limestone are roughly 30 to 200 feet apart and cover about 2 to 25 percent of the surface. Commonly, these outcrops cover about 12 percent of the surface. Karst topography, including bowl-like depressions, is common.

The root zone is shallow to moderately deep. Moisture-supplying capacity and natural fertility are moderate. Permeability is moderately slow.

Rock outcrops make the Caneyville soils difficult to till. Because their plow layer is moderately clayey, these soils clod and crust if tilled when the moisture content is outside a narrow range. They are not suited to row crops, because they are rocky and steep. Forage crops can be grown on the soils that are not too steep for farming and on those that are not severely eroded. Most of the Caneyville soils, though once used for a variety of farm crops, are now wooded, chiefly with cedars. Small, cleared areas are used for short-season grazing.

Representative profile of Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded:

Ap—0 to 6 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure and some weak, fine, granular structure; slightly firm; slightly acid; clear, smooth boundary; 5 to 7 inches thick.

B1t—6 to 10 inches, dark-brown (7.5YR 4/4) heavy silty clay loam; moderate, medium, subangular blocky structure; firm; few, thin clay films; slightly acid; clear, smooth boundary; 3 to 6 inches thick.

B2t—10 to 25 inches, strong-brown (7.5YR 5/6) silty clay; moderate, medium, subangular blocky structure; very firm; few, patchy clay films; few, small, brown fragments of weathered sandstone and some sand grains scattered through most of the soil layer; slightly acid; clear, wavy boundary; 10 to 18 inches thick.

B3t—25 to 35 inches, yellowish-red (5YR 4/6) clay or silty clay; weak, medium, angular and subangular blocky structure; very firm, sticky, plastic; few, thin clay films; few, small sandstone fragments and few pockets of sand grains; strongly acid; 4 to 12 inches thick.

R—35 inches +, limestone and sandstone bedrock.

The Ap horizon ranges in color to brown (10YR 4/3), dark yellowish brown (10YR 4/4), or dark brown (7.5YR 4/2). In some places it is fine sandy loam or silt loam. The B2t horizon ranges in hue from 7.5YR to 5YR. In some places pockets of sandy clay loam occur in the B2t horizon and the B3t horizon. In some places the B3t horizon is absent and in its place is a C horizon of massive clay that is variegated yellowish brown, brown, and red.

The depth to bedrock is about 30 inches in many places, but the range is from about 16 to 36 inches.

The Caneyville soils are associated with the Fredonia soils, which are well drained and moderately deep. They are lighter colored and less red than the Fredonia soils.

Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded (CaD2).—A profile of this soil was described as representative for the series. This soil is sloping to strongly sloping and occupies sink-dotted karst topography. The root zone is moderately deep. The organic-matter content is low.

Included with this soil in mapping are a few small areas that are slightly less eroded than this soil. The surface layer of these inclusions is darker and slightly thicker than that of this soil.

Rockiness makes this Caneyville soil unsuited to cultivated crops. The soil is fairly well suited to pasture and well suited to growing trees and providing food and cover for wildlife. (Capability unit VIs–1; woodland group 8)

Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded (CcD3).—This strongly sloping to moderately steep, severely eroded soil has a profile similar to that described for the series. It has, however, a surface layer that is strong brown and more clayey. Shallow gullies are numerous. The root zone is commonly shallow. The organic-matter content is very low.

Mapped with this soil are small areas that have slopes of 6 to 12 percent. Also included is a small acreage that is slightly less eroded. The inclusions have a surface layer that is more friable and darker than the surface layer of this soil.

Rock outcrops and the results of erosion make this Caneyville soil unsuitable for cultivation. It should have protective cover. Its potential productivity is low. It is suitable for growing trees and providing food and cover for wildlife. (Capability unit VIIs–2; woodland group 3)

Christian Series

The Christian series consists of deep, well-drained, gently sloping to strongly sloping soils. These soils developed in residual material from interbedded limestone and sandstone and a small component of shale.

The surface layer is brown, friable cherty loam or silt loam. The upper part of the subsoil is red or yellowish red and ranges from very firm to firm cherty sandy clay loam to silty clay or cherty clay. There is a gradual transition to dark-red cherty clay, clay loam, or cherty clay loam in the lower subsoil. Some areas of Christian soils have karst topography, including bowl-like depressions.

The root zone is deep. Moisture-supplying capacity is moderate to high, and natural fertility is moderately high. Permeability is moderately slow. Acidity of the cherty soils ranges from slight to medium in the upper subsoil to very strong in the lower subsoil. Acidity of the noncherty soils is normally very strong throughout the subsoil.

The Christian soils, except those that are severely eroded, can be cultivated throughout a wide range of moisture content without clodding or crusting. In severely eroded areas the more clayey texture of the plow layer restricts the range of moisture content that is favorable for cultivation. Chert fragments interfere somewhat with cultivation of the cherty Christian soils. Most of the acreage of the Christian soils is used for row crops, hay, and pasture. The rest is wooded.

Representative profile of Christian cherty loam, 2 to 6 percent slopes:

Ap—0 to 6 inches, brown (10YR 4/3) cherty loam; weak, fine, granular structure; friable; slightly acid; gradual, wavy boundary; 5 to 9 inches thick.

B21t—6 to 13 inches, yellowish-red (5YR 4/6), cherty heavy sandy clay loam; moderate, medium, subangular and angular blocky structure; firm; common clay films; slightly acid; gradual, smooth boundary; 3 to 8 inches thick.

B22t—13 to 22 inches, red (2.5YR 4/6) cherty clay; strong, medium, subangular blocky structure; firm, sticky, plastic; many clay films; medium acid; gradual, smooth boundary; 6 to 10 inches thick.

B23t—22 to 45 inches, dark-red (2.5YR 3/6), cherty heavy clay loam; strong, medium, angular blocky structure; firm; common clay films; very strongly acid; gradual, smooth boundary; 8 to 26 inches thick.

B24t—45 to 55 inches+, dark-red (10R 3/6) cherty clay; common, medium, distinct variegations of yellowish red (5YR 4/6) and strong brown (7.5YR 5/6); strong, fine and medium, angular blocky structure; very firm, sticky, plastic; many clay films; common, medium and coarse, weathered chert; few, small, weathered sandstone fragments; very strongly acid; about 7 to 14 inches thick.

Representative profile of Christian silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 5/3 to 4/3) silt loam; weak, fine, granular structure; friable; many roots; strongly acid; gradual, smooth boundary; 7 to 10 inches thick.

A2—8 to 14 inches, yellowish-brown (10YR 5/8) silt loam; weak, fine and medium, subangular blocky structure; friable; many roots; few, small, black concretions; very strongly acid; gradual, smooth boundary; 4 to 8 inches thick.

B21t—14 to 27 inches, red (2.5YR 5/8) silty clay; common, medium, distinct variegations of strong brown (7.5YR 5/8) and yellowish brown (10YR 5/8); moderate, medium, angular blocky structure; very firm; common sand grains; common clay films; few, small, brown concretions; very strongly acid; gradual, wavy boundary; 12 to 24 inches thick.

B22t—27 to 34 inches, dark-red (2.5YR 3/6) silty clay; few, medium, distinct variegations of strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6); moderate, fine and medium, angular blocky structure; very firm; common clay films; common sand grains; few small sandstone fragments; very strongly acid; gradual, wavy boundary; 0 to 14 inches thick.

B3t—34 to 46 inches +, dark-red (2.5YR 3/6) clay loam; common, medium, distinct variegations of strong brown (7.5YR 5/8), brownish yellow (10YR 6/8), and very pale brown (10YR 7/3); moderate, medium, angular blocky structure; firm; common clay films; few small sandstone fragments and few small pieces of chert; very strongly acid; about 10 to 20 inches thick.

Texture of the Ap horizon, in most places, is loam or silt loam, but in some places it ranges to fine sandy loam. The Ap horizon in most places is brown (10YR 4/3 to 5/3). In some places there is a B1 horizon of yellowish-red silt loam. The B21t horizon ranges from silty clay to silty clay loam or heavy sandy clay loam and from yellowish red to red. The B22t and lower horizons range from clay to sandy clay, silty clay, and heavy clay loam.

The depth to bedrock commonly ranges from 4 to 7 feet. The thickness of the solum ranges from 36 to 60 inches. The chert content of the A and B horizons of the cherty soils ranges from about 15 to 40 percent, by volume.

The Christian soils are associated with the Cumberland, Baxter, Talbott, Crider, and Pembroke soils, which are also well drained. The Christian soils have more sand in the lower subsoil than any of the latter soils. They are more clayey and less friable in the upper subsoil than the Crider and Pembroke soils. The Christian soils are redder than the Crider soils. They have a lighter colored Ap horizon than the Cumberland soils. They have a subsoil that is less firm and plastic than that of the Talbott soils.

Christian cherty loam, 2 to 6 percent slopes (CeB).—A profile of this soil was described as representative of a cherty Christian soil. This soil is gently sloping and occupies broad to moderately broad ridges. The organic-matter content is medium.

Included with this soil in mapping are small areas that are slightly more eroded than this soil. The surface layer of these inclusions is slightly thinner and lighter colored than the surface layer of this soil.

This Christian soil is suitable for all crops grown in the county. There is a moderate hazard of erosion when it is cultivated. (Capability unit IIe-11; woodland group 1)

Christian cherty loam, 6 to 12 percent slopes, eroded (CeC2).—This sloping soil has a profile similar to that described as representative of a cherty Christian soil. The plow layer, however, contains some subsoil material and is less friable and lighter colored than the plow layer in the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas that are slightly less eroded than this soil. The surface layer of these inclusions is slightly thicker and darker.

This Christian soil is suited to all the crops commonly grown in the county. There is a severe hazard of erosion when it is used for cultivated crops. (Capability unit IIIe-6; woodland group 1)

Christian cherty loam, 12 to 20 percent slopes, eroded (CeD2).—This strongly sloping soil has a profile similar to that described as representative of cherty Christian soil. It, however, has a surface layer that contains some subsoil material and is less friable and lighter colored than that in the profile described for the series. The organic-matter content is low.

Included with this soil in mapping are a few small areas that are less eroded than this soil. The surface layer of these inclusions is slightly thicker and darker than the surface layer of this soil. Also included with this soil in mapping are a few, small, galled areas where the subsoil is exposed.

There is a very severe hazard of erosion when this soil is used for cultivated crops. The soil is suitable for only occasional growing of such crops. It is well suited to pasture or hay crops. (Capability unit IVe-3; woodland group 1)

Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded (ChC3).—This sloping, severely eroded soil has a profile similar to that described as representative of cherty Christian soil. It, however, has a surface layer of strong-brown to yellowish-red, firm cherty sandy clay loam. In some areas there are numerous shallow gullies. The organic-matter content is very low.

As a result of erosion, and because there is a hazard of additional erosion, this soil is suited to only occasional cultivation. It is better suited to woods and to pasture plants that make much growth in spring and early in summer. (Capability unit IVe-11; woodland group 3)

Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded (ChD3).—This strongly sloping soil has a profile similar to that described as representative of a cherty Christian soil. The surface layer, however, is yellowish-red to strong-brown, firm cherty sandy clay loam. In some places there are numerous shallow gullies. The organic-matter content is very low.

Because of its steepness and the result of erosion, this soil is not suited to cultivation. It should remain under protective cover, such as that afforded by pasture, woods, or plants that provide food and cover for wildlife. (Capability unit VIe-2; woodland group 3)

Christian silt loam, 2 to 6 percent slopes (ClB).—A profile of this soil was described as representative of a noncherty Christian soil. This soil is gently sloping and occupies broad ridges. The organic-matter content is medium.

Included with this soil in mapping are small areas that are slightly more eroded than this soil. The surface layer of these inclusions is slightly less friable than that of this soil and contains some subsoil material. Also included with this soil are a few small areas that are slightly redder and more clayey in the upper subsoil.

This soil is suited to all crops grown in the county. There is a moderate erosion hazard when it is cultivated. (Capability unit IIe-1; woodland group 1)

Christian silt loam, 6 to 12 percent slopes, eroded (ClC2).—This sloping soil has a profile similar to that described as representative of a noncherty Christian soil. The plow layer, however, contains some subsoil material and is less friable and lighter colored than that in the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas having the original surface layer, which is slightly thicker and darker than the surface layer of this soil. Also included are small areas having an upper subsoil that is slightly redder and more clayey.

This Christian soil is suited to all the crops commonly grown in the county, but there is a severe erosion hazard when it is used for cultivated crops. (Capability unit IIIe-1; woodland group 1)

Christian silty clay loam, 6 to 12 percent slopes, severely eroded (CmC3).—This severely eroded, sloping soil has a profile similar to that described as representative

of a noncherty Christian soil. The surface layer, however, is red or reddish-brown, firm silty clay loam. In some areas there are numerous shallow gullies. The organic-matter content is very low.

The results of erosion and a hazard of additional erosion make this soil suitable for only occasional cultivation. It is better used for pasture or hay and is suited to plants that make a large growth in spring and early in summer. (Capability unit IVe-11; woodland group 3)

Clarksville Series

The Clarksville series consists of well-drained, gently sloping to moderately steep, acid soils of the cherty limestone uplands. These soils occupy moderately broad to narrow ridges.

The surface layer is very friable cherty silt loam. The upper subsoil is yellowish-brown, friable cherty silt loam. There is a gradual transition to strong-brown, firm, cherty heavy silt loam to very cherty silty clay loam in the lower subsoil.

The root zone is deep. Moisture-supplying capacity and natural fertility are moderate. Permeability is moderately rapid.

The Clarksville soils are somewhat difficult to till because of chert fragments. They can be cultivated throughout a wide range of moisture content without clodding or crusting. Most of the acreage of these soils is cleared. The areas of gently sloping to rolling Clarksville soils are used for pasture and cultivated crops. Second-growth hardwoods are on some areas of the steeper soils.

Representative profile of Clarksville cherty silt loam, 6 to 12 percent slopes, eroded:

Ap—0 to 5 inches, yellowish-brown (10YR 5/4) cherty silt loam; weak, fine, granular structure; very friable; medium acid; gradual, smooth boundary; 4 to 6 inches thick.

B1—5 to 12 inches, yellowish-brown (10YR 5/6) cherty silt loam; weak, fine, subangular blocky structure; friable; strongly acid; gradual, smooth boundary; 4 to 10 inches thick.

B2—12 to 24 inches, strong-brown (7.5YR 5/6), cherty heavy silt loam; moderate, medium, subangular blocky structure; firm; clay films in some pores and on some ped surfaces; very strongly acid; gradual, smooth boundary; 8 to 18 inches thick.

B3—24 to 42 inches+, strong-brown (7.5YR 5/8) very cherty silty clay loam; common, fine, faint, light brownish-gray (10YR 6/2) variegations; moderate, medium, subangular blocky structure; firm; strongly acid; 18 to 40 inches thick.

The Ap horizon, where it is uneroded, ranges from brown (10YR 5/3 to 4/3) to yellowish brown (10YR 5/4). The B2 horizon ranges from strong brown (7.5YR 5/6) through yellowish brown (10YR 5/6 to 5/8). The B2 horizon in some profiles is silty clay loam.

The depth to a chert bed or to bedrock ranges from about 30 to 65 inches. The chert content of the A and B horizons ranges from about 15 to 40 percent, by volume.

The Clarksville soils are associated with the Bodine soils, which are excessively drained; with the Garmon soils, which are somewhat excessively drained; and with the Baxter and Mountview soils, which are well drained. They have stronger horizonation, are finer textured, and contain less chert than Bodine soils. They formed in cherty material and have a cherty profile as a result. In this way they differ from the Garmon soils, which formed mainly in shaly limestone and shale. The Clarksville soils are less red and less clayey in the subsoil than the Baxter soils and are more cherty throughout the profile than the Mountview soils.

Clarksville cherty silt loam, 2 to 6 percent slopes (CnB).—This soil has a profile similar to that described for the series. It, however, has a plow layer that is slightly more friable, is darker, and contains more original surface-soil material than the plow layer in the described profile. It is gently sloping and occupies moderately wide ridgetops. The organic-matter content is low.

Included with this soil in mapping are a few small areas that have the original surface soil mixed with the subsoil. These inclusions have a surface layer that is slightly thinner and yellower than that of this soil.

This Clarksville soil is suitable for all crops grown in the county. There is a moderate erosion hazard when it is cultivated. (Capability unit IIe-11; woodland group 1)

Clarksville cherty silt loam, 6 to 12 percent slopes, eroded (CnC2).—A profile of this soil was described as representative for the series. This soil is sloping and occupies ridges. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded and have a surface layer that is slightly more friable and darker than the surface layer of this soil. Also included with this soil in mapping are small areas where the subsoil is exposed and the surface layer is a strong-brown, cherty heavy silt loam.

This Clarksville soil is suited to most of the crops commonly grown in the county. There is a severe hazard of erosion when it is used for cultivated crops. It is suited to plants that make a large growth in spring and early in summer. (Capability unit IIIe-6; woodland group 1)

Clarksville cherty silt loam, 12 to 20 percent slopes, eroded (CnD2).—This strongly sloping soil has a profile like the one described for the series. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded and are slightly more friable and darker in the surface layer than this soil. Also included with this soil in mapping are small areas where the strong-brown, cherty, heavy silt loam subsoil is exposed.

The Clarksville soil is subject to very severe erosion when it is cultivated, and it is suitable for only occasional growing of row crops. Yields are generally only fair. The soil is well suited to pasture and hay crops. (Capability unit IVe-3; woodland group 1)

Clarksville cherty silt loam, 20 to 30 percent slopes, eroded (CnE2).—This soil has a profile like the one described for the series. It is moderately steep and occupies side slopes. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded and are slightly thicker and darker in the surface layer than this soil. Also included with this soil are small areas where the strong-brown, cherty, heavy silt loam subsoil is exposed.

Because of its steepness and a hazard of erosion, this Clarksville soil is not suited to cultivation. It is suited to pasture and to growing trees and providing food and cover for wildlife. (Capability unit VIe-1; woodland group 1)

Crider Series

The Crider series consists of deep, well-drained soils of the uplands. The upper horizons formed chiefly in loess, and the lower layers formed in residual material from limestone.

The Crider soils have a dark grayish-brown, very friable, silt loam surface layer. There is a gradual transition from dark yellowish-brown, friable silt loam to dark-red, firm silty clay loam in the subsoil and to silty clay in the lower subsoil.

The root zone is deep. Moisture-supplying capacity and natural fertility are high. Reaction is acid throughout the profile. Permeability is moderate.

The Crider soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Most of the acreage of these soils is used for row crops, hay, and pasture. A small acreage is wooded.

Representative profile of Crider silt loam, 2 to 6 percent slopes. (Profile S59Ky–5–2 in tables 9 and 10):

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; abundance of roots; few worm casts; strongly acid; abrupt, smooth boundary; 6 to 10 inches thick.

B1—7 to 11 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, faint, dark-brown (7.5YR 3/2) variegations; weak, medium, subangular blocky structure; friable; common worm casts; many roots; occasional very small, dark-brown concretions; very strongly acid; gradual, smooth boundary; 3 to 6 inches thick.

B21t—11 to 18 inches, dark yellowish-brown (10YR 4/4) to dark-brown (7.5YR 4/4) silt loam; moderate to weak, medium, subangular blocky structure; friable; thin clay films; pale-brown (10YR 6/3) silt coatings on some ped surfaces; common worm casts; many roots; very strongly acid; gradual, smooth boundary; 6 to 9 inches thick.

B22t—18 to 23 inches, light silty clay loam; ped surfaces are dark brown (7.5YR 4/4); material is strong brown (7.5YR 5/6) when crushed; moderate, medium and coarse, subangular blocky structure; firm; common clay films; few, small pieces of weathered chert impregnated with reddish iron concretions; few roots; few worm casts; very strongly acid; clear, wavy boundary; 5 to 10 inches thick.

B23t—23 to 27 inches, dark-brown (7.5YR 4/4) silty clay loam; common, medium, distinct, reddish-brown (5YR 4/4) variegations; moderate, medium, angular blocky structure; firm; noticeable clay films; few, dark reddish-brown concretions; few worm casts; few, small roots; very strongly acid; clear, smooth boundary; 3 to 6 inches thick.

IIB24t—27 to 30 inches, dark-red (2.5YR 3/6) silty clay loam; common, fine, distinct, light olive-brown (2.5Y 5/4) and pale-brown (10YR 6/3) variegations; moderate, medium, angular blocky structure; firm; slightly sticky when wet; noticeable clay films; common chert pieces (1 to 5 centimeters in diameter); few, small, brown concretions; few, small roots; some worm casts; very strongly acid; clear, smooth boundary; 3 to 5 inches thick.

IIIB25t—30 to 39 inches, dark-red (2.5YR 3/6) heavy silty clay loam; common, medium and fine, distinct, yellowish-brown (10YR 5/4) and light olive-brown (2.5Y 5/4) variegations; strong, medium, angular blocky structure; firm; slightly plastic and sticky when wet; noticeable clay films; pale-brown silt coatings on a few of the vertical structural faces; common iron concretions; few, fine roots; very strongly acid; gradual, smooth boundary; 5 to 12 inches thick.

IIIB26t—39 to 51 inches, silty clay; ped surfaces are dusky red (10R 3/4); material is dark red (10R 3/6) when crushed; strong, medium and fine, angular blocky structure; very firm; plastic and sticky when wet; prominent clay films; coatings of dark grayish-brown (2.5Y 4/2) silt on a few vertical ped surfaces; very strongly acid; gradual, smooth boundary; 8 to 13 inches thick.

IIIB27t—51 to 63 inches, dark-red (10R 3/6) silty clay; noticeable amount of fine sand; moderate, medium, angular blocky structure; firm; plastic and sticky when wet; noticeable clay films; common dark grayish-brown (2.5Y 4/2) coatings of very fine silt; very strongly acid; gradual, smooth boundary; 8 to 14 inches thick.

IIIB3t—63 to 71 inches, dark-red (10R 3/6) heavy silty clay loam; few, medium, distinct, light olive-brown (2.5Y 5/4) variegations; moderate, coarse, blocky macrostructure and weak, angular blocky microstructure; firm; clay films on macrostructure faces; common, small, yellowish-brown chert pieces; noticeable amount of fine sand; few iron concretions; very strongly acid; diffuse, smooth boundary; 4 to 9 inches thick.

IIIC—71 to 78 inches, dark-red (10R 3/6) heavy clay loam; common, medium, distinct, grayish-brown (2.5Y 5/2) and brown (10YR 5/3) variegations; weak, coarse, angular blocky structure or massive; firm; plastic and sticky when wet; very strongly acid.

In some places the Ap horizon ranges to dark brown (7.5YR 3/2) and brown (10YR 4/3). In some places the B21t and B22t horizons are reddish brown (5YR 4/4). In some places the A, B1, and B21t horizons are medium acid. In some places the lower subsoil contains less sand than the lower subsoil of the representative profile described for the series and is silty clay loam. The C horizon is cherty clay or silty clay loam in some places.

The depth to limestone bedrock ranges from about 5 to 10 feet. The thickness of the solum ranges from 4 to 8 feet. The loess mantle is recognizable to depths of 20 to 40 inches.

The Crider soils are associated with the Cumberland, Pembroke, Nolichucky, and Mountview soils, which are also well drained, and with the Dickson soils, which are moderately well drained. They are less red and less clayey in the upper subsoil than the Cumberland, Pembroke, and Nolichucky soils. They have a darker surface layer and are redder in the lower subsoil than the Mountview and Dickson soils. They lack the fragipan of the Dickson soils.

Crider silt loam, 2 to 6 percent slopes (CrB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies broad ridgetops. The organic-matter content is medium.

Mapped with this soil are a few areas that are slightly more eroded and are slightly thinner and lighter colored in the surface layer than this soil. Also included with this soil in mapping is a small acreage of a soil that is on stream terraces and is less red and more friable in the lower subsoil than this soil.

This Crider soil is suitable for all the crops commonly grown in the county, especially alfalfa and burley tobacco. There is a moderate erosion hazard when it is used for cultivated crops. (Capability unit IIe–1; woodland group 1)

Crider silt loam, 6 to 12 percent slopes, eroded (CrC2).—This sloping soil has a profile similar to that described for the series. The plow layer, however, contains some subsoil material and is less friable and lighter colored than the plow layer of the described profile. The organic-matter content is low.

Mapped with this soil are small areas that are less eroded and are more friable in the surface layer than this soil. Also included with this soil in mapping are a few, small, galled areas where subsoil is exposed at the surface. Another inclusion is a small acreage of a sloping soil on stream terraces that is less red and more friable in the lower subsoil than this soil.

This Crider soil is suitable for growing all the crops common in the county. When it is used for cultivated crops, however, there is a severe erosion hazard. (Capability unit IIIe–1; woodland group 1)

Cumberland Series

The Cumberland series consists of deep, well-drained, cherty, dark-red soils of the limestone uplands. These soils are gently sloping to strongly sloping and occupy karst terrain. For the most part, drainage of the areas occupied by these soils is through underground streams. Sinks are common in most delineations of these soils.

The surface layer is friable cherty silt loam. The upper subsoil is dark-red, firm cherty silty clay loam that grades to dark-red cherty silty clay or clay at a depth of about 9 inches.

The root zone is deep. Moisture-supplying capacity is moderate to high, and natural fertility is high. Reaction of most of these soils is acid. The subsoil is moderately permeable.

The Cumberland soils are somewhat difficult to till because the plow layer contains chert fragments. Those that are not severely eroded can be cultivated throughout a wide range of moisture content without clodding and crusting. In severely eroded areas, the more clayey plow layer restricts the range of moisture content that is favorable for cultivation. Most of the acreage of Cumberland soils is used for pasture and cultivated crops (fig. 7). Small woodlots of second-growth hardwoods are on some areas of the steeper soils. In most areas of Cumberland soils, irregular or karst topography makes it difficult to use such erosion control practices as contour cultivation and terracing.

Representative profile of Cumberland cherty silt loam, 2 to 6 percent slopes, eroded:

Ap—0 to 4 inches, dark reddish-brown (5YR 3/3) cherty silt loam; moderate, medium, granular structure; friable; abundance of roots; abundance of worm casts; slightly acid; abrupt, smooth boundary; 3 to 8 inches thick.

B1t—4 to 9 inches, dark-red (2.5YR 3/6) cherty silty clay loam; moderate, medium and fine, subangular blocky structure; firm; few, thin clay films; common roots; slightly acid; clear, smooth boundary; 2 to 6 inches thick.

B21t—9 to 22 inches, dark-red (2.5YR 3/6) cherty silty clay; moderate to strong, medium, subangular blocky structure; firm, sticky, plastic; common clay films; few pockets of yellowish-brown (10YR 5/6) silt loam; medium acid; gradual, smooth boundary; 10 to 20 inches thick.

B22t—22 to 33 inches, dark-red (10R 3/6) cherty silty clay; moderate to strong, medium, angular blocky structure; very firm, very sticky, very plastic; common clay films; brown (7.5YR 5/4) silt coatings on some ped surfaces; strongly acid; diffuse, smooth boundary; 10 to 20 inches thick.

B23t—33 to 66 inches +, cherty clay; ped surfaces are dark red (10R 3/6), and material is red (10R 4/6) when crushed; strong, medium, angular blocky structure; very firm, very sticky, very plastic; many distinct clay films; strongly acid; about 1 to 3 feet thick.

The Ap horizon ranges to dark brown (10YR 3/3 or 7.5YR 3/2) and dark reddish brown (5YR 3/4). Where the soil has been severely eroded, the texture of the Ap horizon is silty clay in most places. In some places there is no B1t horizon. The B21t horizon in some places is dark reddish brown (5YR 3/4 or 2.5YR 3/4), and in some places the B22t horizon is dark reddish brown (2.5YR 3/4) or dusky red (10R 3/4). In some places the B22t is clay.

The solum ranges from about 4 to 10 feet in thickness. Bedrock outcrops in a few areas, but depth to limestone bedrock in most places is more than 6 feet. The chert content of the A and B horizons is about 15 to 40 percent, by volume. It commonly increases with depth.

The Cumberland soils are associated with the Pembroke, Crider, and Baxter soils, which are deep and well drained. They are darker throughout the profile and are redder and more clayey in the upper subsoil than the Pembroke, Crider, and Baxter soils. They are more cherty than the Pembroke and Crider soils.

Cumberland cherty silt loam, 2 to 6 percent slopes, eroded (CtB2).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies karst terrain. Shallow, sinklike depressions are common. The organic-matter content is low to medium.

Included with this soil in mapping are areas that are slightly less eroded than this soil. Also included are some areas having slopes of less than 2 percent. These less eroded or nearly level inclusions have a surface layer of dark-brown, friable cherty silt loam about 7 to 10 inches thick. Also included with this soil in mapping are a few, small, galled areas where the subsoil is exposed.

This Cumberland soil is suitable for all crops grown in the county. It is especially suitable for alfalfa and burley tobacco. There is a moderate hazard of erosion when it is used for cultivated crops. (Capability unit IIe–11; woodland group 1)

Cumberland cherty silt loam, 6 to 12 percent slopes, eroded (CtC2).—This soil has a profile like the one described for the series. It occupies sloping karst terrain. Sinklike depressions are common. The organic-matter content is low.

Included with this soil in mapping are small areas that are slightly less eroded than this soil. These inclusions have a surface layer that is slightly thicker, more friable, and darker than the surface layer of this soil. Also included are a few galled areas where the subsoil is exposed.

This Cumberland soil is suitable for all the crops commonly grown in the county, but the erosion hazard is severe when cultivated crops are grown. (Capability unit IIIe–6; woodland group 1)

Cumberland cherty silt loam, 12 to 20 percent slopes, eroded (CtD2).—This soil has a profile like the one described for the series. It is strongly sloping and occupies karst terrain. Sinks are common. The organic-matter content is low.

Figure 7.—**Alfalfa being harvested on Cumberland soils. The irregular karst topography is typical.**

Included with this soil in mapping are a few, small, galled areas where the subsoil is exposed. These inclusions are slightly redder and more clayey in the surface layer than this soil. Also included are some small areas of a soil that has a profile similar to that of the Baxter soils.

The hazard of erosion is very severe when this Cumberland soil is cultivated. This soil is suitable for only occasional growing of row crops. It is well suited to pasture or hay. (Capability unit IVe–3; woodland group 1)

Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded (CuC3).—This severely eroded, sloping soil has a profile similar to that described for the series. The plow layer, however, is dark-red cherty silty clay. There are numerous shallow gullies in some places. Sinks are common. The organic-matter content is very low.

The results of erosion and a hazard of additional erosion make this soil suited to only occasional growing of cultivated crops. It is well suited to pasture and hay. (Capability unit IVe–11; woodland group 3)

Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded (CuD3).—This strongly sloping soil has a profile similar to that described for the series. The original surface soil, however, has eroded away and left a plow layer of dark-red, firm cherty silty clay. There are numerous shallow gullies in some places. The organic-matter content is very low. Steep slopes surrounding sinks are common.

The results of erosion and a very severe hazard of additional erosion make this soil unsuitable for growing row crops. It should be under protective cover, such as that afforded by grass and legume pastures, woodland, and plants that provide food and cover for wildlife. (Capability unit VIe–2; woodland group 3)

Dickson Series

The Dickson series consists of acid, moderately well drained, level to sloping soils of the uplands. These soils developed in part from residual material from limestone and in part from loess.

These soils have a surface layer of brown, very friable silt loam. The subsoil is yellowish-brown, friable to slightly firm silt loam that grades to a mottled, very firm, compact, brittle fragipan at about 28 inches below the surface.

The root zone is moderately deep; its depth is restricted by the fragipan. Moisture-supplying capacity and natural fertility are moderate. Reaction is acid. Permeability is moderate above the fragipan and slow in the fragipan.

The Dickson soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Most of the acreage is used for cultivated crops, hay, and pasture.

Representative profile of Dickson silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary; 5 to 9 inches thick.

B1—8 to 11 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary; 3 to 8 inches thick.

B2t—11 to 28 inches, yellowish-brown (10YR 5/4 to 5/6) heavy silt loam; moderate, medium, subangular blocky structure; slightly firm; few, small, brown concretions; strongly acid; gradual, wavy boundary; 8 to 18 inches thick.

Bxt—28 to 36 inches, mottled yellowish-brown (10YR 5/4), pale-brown (10YR 6/3), light brownish-gray (2.5Y 6/2), and brown (10YR 5/3) heavy silt loam; many, fine and medium, distinct mottles; moderate, medium and coarse, angular blocky structure; very firm, very compact, brittle; common thick clay films on coarse peds; few, dark-brown, soft concretions; very strongly acid; gradual, wavy boundary; 5 to 24 inches thick.

IIC—36 to 72 inches +, variegated yellowish-red (5YR 4/6), pale-yellow (5Y 7/3), and light-gray (5Y 7/2) heavy silty clay loam; weak, blocky structure to massive; firm; few small chert fragments and few, small, dark-brown concretions; very strongly acid; about 2 to 4 feet thick.

In some places the Ap horizon ranges to brown (10YR 4/3). In some places the B2t horizon is brown (7.5YR 4/4) or strong brown (7.5YR 5/6). The lower 3 or 4 inches of the B2t horizon is mottled with brownish gray in some places. In some places the B2t and Bxt horizons are silty clay loam. The chert content of the IIC horizon ranges from 2 to 40 percent, by volume.

The depth to bedrock in most places is 4 to 7 feet or more. Depth to the fragipan ranges from about 24 to 30 inches.

The Dickson soils are associated with the Mountview and Crider soils, which are well drained; with the Sango soils, which are moderately well drained; and with the Taft soils, which are somewhat poorly drained. They differ from Crider soils in having a fragipan and a less red lower subsoil. They differ from the Mountview soils in having a fragipan. They are browner and better drained than the Sango and Taft soils. They are not mottled so near the surface as are the Sango and Taft soils.

Dickson silt loam, 0 to 2 percent slopes (DcA).—This soil has a profile similar to the one described for the series, but gray mottles occur in the lower part of the B2t horizon. This soil is level to nearly level and occupies uplands. The organic-matter content is medium.

Mapped with this soil are small areas of a soil that has a fragipan less than 4 inches thick. Also included with this soil in mapping is a small acreage of soils on stream terraces and foot slopes. These included soils have a profile similar to the one described for this series.

This Dickson soil tends to remain wet during early spring because surface drainage and movement of water through the fragipan are slow. If surface drainage is provided, this soil is suited to most crops commonly grown in the county. It is not suitable for growing alfalfa, which tends to die out in 1 or 2 years as a result of a high water table during winter and early in spring. (Capability unit IIw–1; woodland group 6)

Dickson silt loam, 2 to 6 percent slopes (DcB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies broad ridges. The organic-matter content is medium.

Included with this soil in mapping are small areas that are slightly more eroded than this soil. The surface layer of these inclusions is slightly thinner, less friable, and lighter colored than that of this soil. Also included are small to medium-sized areas of gently sloping soils that are on stream terraces and foot slopes and have characteristics similar to those of this soil.

This Dickson soil is suitable for most of the crops commonly grown in the county. It is not suitable for growing alfalfa, which is short lived on this soil because the fragipan restricts root depth. There is a moderate erosion hazard when this soil is used for cultivated crops. (Capability unit IIe–10; woodland group 1)

Dickson silt loam, 6 to 12 percent slopes, eroded (DcC2).—This sloping soil has a profile similar to that described for the series. The plow layer, however, con-

tains some subsoil material and is less friable and lighter colored than the plow layer of the profile described. The organic-matter content is low.

Mapped with this soil are small areas that are slightly less eroded than this soil and have a surface layer that is slightly thicker, more friable, and darker. Also included with this soil are a few severely eroded areas having a yellowish-brown plow layer that is less friable and has a fragipan that is closer to the surface.

This Dickson soil is suited to most of the crops commonly grown in the county. It is not suitable for alfalfa, which dies out in 2 or 3 years because the fragipan restricts root depth. There is a severe erosion hazard if this soil is used for cultivated crops. (Capability unit IIIe-1; woodland group 1)

Dowellton Series

The Dowellton series consists of poorly drained, level soils. These soils formed mostly from clayey alluvium in large saucer-shaped depressions scattered over the broad ridgetops of the limestone uplands.

The surface layer is light-gray, friable silt loam. The subsoil is firm to very firm silty clay. It is gray mottled with brown and yellow.

The root zone is restricted in depth by a tight clay layer about 12 to 20 inches below the surface. Moisture-supplying capacity is moderate, and natural fertility is moderately low. Reaction is medium acid in the upper horizons and neutral in the lower subsoil. Permeability through the subsoil is slow. Organic-matter content is low. The water table remains near the surface for long periods.

The Dowellton soils are easily tilled, but a high water table normally delays cultivation. Most of the acreage is used for pasture. The Dowellton soils are well suited to this use. A small acreage is in woods.

Representative profile of Dowellton silt loam:

Ap—0 to 8 inches, light-gray (10YR 7/2) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary; 6 to 14 inches thick.

A2g—8 to 18 inches, light-gray (10YR 7/2) silt loam; common, fine and medium, distinct mottles of yellowish brown (10YR 5/6); weak, fine, angular blocky structure; slightly firm; medium acid; gradual, wavy boundary; 4 to 12 inches thick.

B1tg—18 to 24 inches, gray (10YR 5/1) silty clay; fine and medium, distinct mottles of yellowish brown (10YR 5/6), light gray (10YR 7/2), and brownish yellow (10YR 6/8); strong, fine and medium, angular blocky structure; firm, sticky, plastic, hard; few, thin clay films; medium acid; gradual, wavy boundary; 4 to 10 inches thick.

B2tg—24 to 48 inches +, mottled gray (10YR 5/1), brownish-yellow (10YR 6/8), and light olive-brown (2.5Y 5/4) silty clay; moderate, medium, angular blocky structure; very firm, very sticky, very plastic, hard; common clay films; neutral in reaction; about 1 to 3 feet thick.

In some places the Ap horizon ranges to a somewhat darker color than that in the Ap horizon of the representative profile just described. The A2g horizon in some places ranges to dark gray (N 4/0) or grayish brown (10YR 5/2). The B1tg and B2tg horizons in some places are grayish brown (2.5Y 5/2) or light brownish gray (2.5Y 6/2) and gray (5Y 6/1). In some places the B2tg horizon is clay. The depth to bedrock ranges from 4 to 6 feet or more.

The Dowellton soils are associated with the Melvin soils, which are poorly drained; with the Taft and Newark soils, which are somewhat poorly drained; and with the Sango, Dickson, and Hamblen soils, which are moderately well drained. They have a more clayey subsoil than any of these other soils and have stronger structure and horizonation than the Melvin, Newark, and Hamblen soils. They lack the fragipan of the Taft, Sango, and Dickson soils.

Dowellton silt loam (0 to 2 percent slopes) (Do).—A profile of this soil was described as representative for the series. This soil occupies large depressions in the limestone uplands.

Mapped with this soil are small areas of a gently sloping soil that has a surface soil of grayish-brown, friable silt loam, that is less clayey in the subsoil, and that has a fragipan at a depth ranging from about 16 to 20 inches below the surface. The fragipan restricts root growth and water movement.

This Dowellton soil is poorly suited to cultivated crops because it is hard to drain adequately. If some surface drainage is provided, this soil is well suited to pasture. (Capability unit IVw-1; woodland group 7)

Fredonia Series

The Fredonia series consists of well-drained, acid, sloping to strongly sloping soils of the limestone uplands. Sinks and rock outcrops are common in the areas occupied by these soils.

The surface layer is dark reddish-brown silty clay loam. The upper subsoil is dark-red, firm, heavy silty clay loam that grades to dark-red to dusky-red, very firm to extremely firm clay. For the most part, surface water flows away from these soils through underground streams.

The root zone is moderately deep for the most part. Moisture-supplying capacity is moderate, and natural fertility is high. Permeability is moderate to moderately slow.

Rock outcrops and the high clay content of the plow layer make the Fredonia soils somewhat difficult to till. Rockiness makes these soils unsuited to row crops. Most of the Fredonia soils, though once used for a variety of farm crops, are now wooded, chiefly with cedars. Small, cleared areas are used for short-season grazing.

Representative profile of Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded:

Ap—0 to 5 inches, dark reddish-brown (5YR 3/4) silty clay loam; weak, fine, granular structure; friable; many roots; slightly acid; clear, smooth boundary; 4 to 8 inches thick.

B21t—5 to 10 inches, dark-red (2.5YR 3/6) heavy silty clay loam; moderate, medium, subangular blocky structure; firm; few, faint clay films; strongly acid; clear, smooth boundary; 2 to 6 inches thick.

B22t—10 to 18 inches, dark-red (10R 3/6) silty clay; strong, medium, angular blocky structure; very firm, sticky, plastic; common clay films; strongly acid; gradual, wavy boundary; 6 to 12 inches thick.

B23t—18 to 27 inches, dark-red (10R 3/6) clay; strong, medium, angular blocky structure; extremely firm, very sticky, very plastic; many clay films; few, small chert fragments; strongly acid; clear, smooth boundary; 7 to 14 inches thick.

B24t—27 to 30 inches, dusky-red (10R 3/3) clay; strong, medium, angular blocky structure; extremely firm, very sticky, very plastic; common clay films; medium acid; clear, smooth boundary; 3 to 8 inches thick.

R—30 inches +, limestone bedrock; hard and massive.

The B horizon, more than 10 inches below the surface, ranges to redder than 2.5YR and has a color value of 3. In some places, instead of the B24t horizon, there is a C horizon that is massive, neutral, and less red than the B24t horizon in the representative profile described for the series.

The depth to limestone bedrock, in most places, is about 30 inches and ranges from about 20 to 36 inches. Rock outcrops make up about 12 percent of the surface area in most places and cover a range of 2 to 25 percent of the surface area. The texture more than 10 inches below the surface ranges from silty clay to clay.

The Fredonia soils are associated with the Caneyville soils, which are very rocky; with the Pembroke soils, which are deep; and with the Cumberland soils, which are deep and cherty. They are redder and more clayey in the lower subsoil than the Caneyville soils. They have more rock outcrops and are shallower to bedrock than the Pembroke and Cumberland soils.

Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded (FdD2).—A profile of this soil was described as representative for the series. This soil is sloping to strongly sloping and chiefly occupies sink-dotted, karst terrain on uplands. The organic-matter content is low.

Included with this soil in mapping are small areas that have slopes of less than 6 percent. Also included are a few, small, galled areas where the subsoil is exposed.

Many rock outcrops make it impractical to grow row crops on this Fredonia soil. The soil is fairly well suited to pasture and to growing trees and providing food and cover for wildlife. (Capability unit VIs-1; woodland group 8)

Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded (FrC3).—This sloping, severely eroded soil has a profile similar to that described for the series. It, however, has a dark-red, firm, clayey plow layer that consists mostly of subsoil material. There are shallow gullies in some places. The organic-matter content is very low.

Included with this soil in mapping are small areas that have slopes of more than 12 percent. Also included are some areas that are droughty and shallow to bedrock.

Rock outcrops and the results of erosion make this Fredonia soil unsuited to cultivation. The soil is suited to pasture or woods and to providing food and cover for wildlife. (Capability unit VIs-1; woodland group 3)

Garmon Series

The Garmon series consists of somewhat excessively drained, shallow to moderately deep, gently sloping to steep soils developed from shaly limestone and calcareous shale. These soils are on uplands.

The surface layer is dark grayish-brown, very friable silt loam. The subsoil is yellowish-brown, friable shaly silt loam.

The root zone is shallow to moderately deep. Moisture-supplying capacity is moderate to low, and natural fertility is moderate to moderately low. Permeability is moderate to moderately rapid in the subsoil. Reaction is neutral to slightly acid.

The Garmon soils are easily tilled throughout a wide range of moisture content without clodding or crusting. About half of the acreage of these soils is used for pasture and cultivated crops. Second-growth hardwoods are on many areas of the steeper soils. Some areas of Garmon soils are vegetated with broomsedge and bushes of no economic value.

Representative profile of Garmon silt loam, 20 to 35 percent slopes:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; 20 percent consists of shale fragments; many roots; neutral; clear, smooth boundary; 4 to 9 inches thick.

B—7 to 18 inches, yellowish-brown (10YR 5/4 to 5/6) shaly silt loam; weak, fine, subangular blocky structure; friable; 30 percent consists of shale fragments; many roots; slightly acid (pH 6.5); gradual, wavy boundary; 7 to 11 inches thick.

C—18 to 27 inches, yellowish-brown (10YR 5/4) shaly silt loam; weak, fine, subangular blocky structure; friable; 45 percent consists of shale fragments; common roots; neutral (pH 6.8 to 7.0); gradual, wavy boundary; 6 to 12 inches thick.

R—27 inches +, very dark gray (5Y 3/1) shale or shaly limestone; platy; weakly calcareous; olive-gray (5Y 5/2) silt coats (pH 8.0 and calcareous) on the shale; broken surfaces are olive gray (5Y 4/2).

In some places the Ap horizon ranges to brown (10YR 4/3 to 5/3) and dark yellowish brown (10YR 4/4). In other places the A1 horizon is thin and is very dark grayish brown (10YR 3/2). In places the B horizon is pale brown (10YR 6/3), yellowish brown (10YR 5/8), and light olive brown (2.5Y 5/4 to 5/6). The texture ranges from silt loam to light silty clay loam. Colors throughout the profile are much like the colors of the parent materials.

The solum ranges from about 14 to 26 inches in thickness. The depth to bedrock ranges from about 20 to 36 inches. The coarse fragments in the soil are mostly pieces of shale ¼ to 1 inch in size. They are absent from the solum in some places. Generally, however, they range from 10 to 20 percent, by volume, of the Ap horizon, and from 15 to 45 percent of the B and C horizons.

The Garmon soils are associated with the Bodine soils, which are excessively drained; the Clarksville, Needmore, and Mountview soils, which are well drained; and the Dickson and Sango soils, which are moderately well drained. The calcareous parent rock and coarse shale fragments in their profile distinguish the Garmon soils from Bodine and Clarksville soils. The Garmon soils are less clayey and less acid throughout the subsoil than the Needmore soils. They are shallower to bedrock and are more shaly throughout the subsoil than the Mountview soils. They are better drained than the Dickson and Sango soils, and they lack the fragipan of the Dickson and Sango soils.

Garmon silt loam, 2 to 6 percent slopes (GaB).—This soil has a profile similar to the one described for the series. The A and B horizons of this soil, however, are relatively free of shale. This soil is gently sloping and occupies ridges. The organic-matter content is low, and the moisture-supplying capacity is moderate.

Mapped with this soil are small areas that are moderately eroded and have subsoil material mixed into the plow layer.

This Garmon soil is suited to most of the crops commonly grown in the county. There is a moderate hazard of erosion when it is used for cultivated crops. (Capability unit IIe-10; woodland group 2)

Garmon silt loam, 6 to 12 percent slopes, eroded (GaC2).—This sloping soil has a profile similar to that described for the series. The plow layer, however, contains some subsoil material and is less friable and lighter colored than the plow layer of the described profile. Moreover, the solum of this soil contains fewer coarse fragments. This soil occupies ridgetops in the uplands. The organic-matter content is very low, and the moisture-supplying capacity is low to moderate.

Mapped with this soil are small areas that are less eroded than this soil and that have a surface layer that is slightly darker and more friable than the surface layer of this soil. Also included with this soil in mapping are small areas where depth to bedrock is less than 20 inches.

Yields of the crops commonly grown in the county are fair on this Garmon soil. Because it is droughty and there is a hazard of erosion when it is cultivated, this soil is poorly suited to row crops. It is more suitable for pasture.

and for growing trees and providing food and cover for wildlife. (Capability unit IVs-2; woodland group 2)

Garmon silt loam, 12 to 20 percent slopes (GaD).—This soil has a profile similar to that described for the series. It occupies narrow ridges and upper ridgetops. The moisture-supplying capacity and organic-matter content are low.

This soil is not suited to cultivation. It is fairly well suited to pasture if drought-resistant grasses and legumes are grown. It is also suitable for growing trees and providing food and cover for wildlife. (Capability unit VIs-3; woodland group 2)

Garmon silt loam, 20 to 35 percent slopes (GaE).—A profile of this soil was described as representative for the series. This soil occupies steep side slopes. It has a low moisture-supplying capacity and a low content of organic matter.

Mapped with this soil are areas where bedrock lies 20 inches or less below the surface.

This Garmon soil is not suited to cultivation. It is poorly suited to pasture because of steepness, low yields, and a hazard of erosion. It is better suited to growing trees and providing food and cover for wildlife. (Capability unit VIIe-2; woodland group 2)

Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded (GmE3).—This severely eroded soil has a profile similar to that described for the series. The plow layer of this soil, however, consists mostly of subsoil, and the depth to bedrock is less than in the described profile. This soil has a low available moisture capacity, and its organic-matter content is very low.

Mapped with this soil are some areas where bedrock lies less than 20 inches below the surface. Also included with this soil in mapping are small areas of shallow gullies.

The results of erosion and the hazard of additional erosion make this Garmon soil unsuitable for cultivation. It is not well suited to pasture, because it is droughty. It is better suited to growing trees and providing food and cover for wildlife. (Capability unit VIIs-2; woodland group 3)

Gullied Land

Gullied land (Gu) is a miscellaneous land type consisting of severely gullied areas having an intricate pattern of moderately deep to deep gullies. The characteristics of the original soils have been destroyed, except in small areas between the gullies. A few patches of surface soil are between the gullies in some places. In most places, however, erosion has destroyed the original soil profile. Most areas of Gullied land are extremely acid and are sloping to moderately steep. Small areas of Gullied land are in most parts of the county.

Included with Gullied land in mapping are small areas that are not gullied but are without most or all of the solum, which has been removed by sheet erosion.

Gullied land is not suited to row crops or even to pasture. It is mostly idle. Sediments from it are a serious threat to crop and pastureland lying immediately below it. A few small areas of Gullied land have been reclaimed for use as pasture by filling in gullies and leveling the surface with heavy machinery. In most cases, though, this method of reclamation is expensive and economically impractical.

Tree plantings generally survive poorly on Gullied land. Trees grow slowly, except on the narrow strips or patches between gullies where the soil profile has not been destroyed. Here they make good growth. In many places sericea lespedeza or kudzu will cover gullied areas better than trees. (Capability unit VIIe-4; woodland group 10)

Hamblen Series

The Hamblen series consists of level, moderately well drained soils of medium acidity. These soils formed in sediments washed chiefly from soils underlain by limestone. They occupy flood plains and upland depressions.

The surface layer is brown, very friable silt loam. The subsoil is friable silt loam. The upper part of the subsoil is brown. There is a gradual transition to brown faintly mottled with gray at about 21 inches below the surface.

The root zone is deep. Moisture-supplying capacity and natural fertility are high. Reaction is slightly to medium acid. Permeability is moderate. A high water table makes the soil wet, especially during early spring rains.

The Hamblen soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Most areas are cultivated or pastured. The Hamblen soils are suited to growing most crop and pasture plants commonly grown in the county. Alfalfa can be grown on them, but it is subject to being killed by overflow water from streams. Tile drainage can be used to eliminate the seasonal high water table.

Representative profile of Hamblen silt loam:

Ap—0 to 10 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; slightly acid; clear, smooth boundary; 5 to 14 inches thick.

B21—10 to 21 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; slightly acid; gradual, smooth boundary; 5 to 14 inches thick.

B22—21 to 34 inches, brown (10YR 5/3) silt loam; common, fine, faint mottles of pale brown (10YR 6/3), light gray (2.5Y 7/2), and light brownish gray (2.5Y 6/2 to 10YR 6/2); weak, fine, granular structure; friable; medium to slightly acid; clear, smooth boundary; 6 to 18 inches thick.

C—34 to 48 inches +, light brownish-gray (10YR 6/2 to 2.5Y 6/2) silt loam; common, fine and medium, distinct mottles of dark yellowish brown (10YR 4/4), grayish brown (2.5Y 5/2), light yellowish brown (10YR 6/4), and light gray (2.5Y 7/2); weak, fine, angular blocky structure to massive; slightly firm; few, small, dark-brown concretions; few, gravel-size chert fragments; medium acid; 12 inches or more thick.

The Ap horizon ranges from brown (10YR 4/3) to dark brown (10YR 3/3 or 7.5YR 3/2) or brown (10YR 5/3) and dark grayish brown (10YR 4/2). In some places the B21 horizon is yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/4), or, in sink areas, reddish brown (5YR 4/3). The dominant color of the B22 horizon is brown (10YR 5/3), dark yellowish brown (10YR 4/4), or light olive brown (2.5Y 5/4). The dominant color of the C horizon is light brownish gray (10YR 6/2 to 2.5Y 6/2), light olive gray (5Y 6/2), or gray (5Y 5/1).

The depth to bedrock ranges from 6 to 10 feet. Mottling normally begins at about 18 to 30 inches below the surface and increases with depth. In some places stratified alluvial sand, silt, and gravel occur as pale-brown and gray, thin layers, or strata, more than 48 inches below the surface. Reaction is commonly slightly acid to neutral in the upper horizons and slightly to medium acid in the lower horizons.

The Hamblen soils are associated with the Morganfield soils, which are well drained; with the Newark soils, which are somewhat poorly drained; and with the Dickson soils, which are moderately well drained. They are less well drained and more mottled than the Morganfield soils. They are less mottled and less gray, especially at shallow depths, than the Newark soils.

They have weak horizonation, and they lack the fragipan of the Dickson soils.

Hamblen silt loam (0 to 2 percent slopes) (Ha).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is medium. A seasonal high water table causes the soil to be wet at times. Some areas are subject to occasional flooding.

This soil can be intensively cultivated but is subject to scouring where overflow currents are rapid. Drainage can be installed to lower the water table. (Capability unit I–2; woodland group 5)

Humphreys Series

The Humphreys series consists of well-drained soils of the stream terraces, alluvial fans, and foot slopes. These soils developed in soil material washed or rolled chiefly from soils derived from cherty limestone.

The surface layer is dark-brown, very friable cherty silt loam. The upper subsoil is brown, friable, cherty light silty clay loam. There is a gradual transition to yellowish-brown, slightly firm cherty silty clay loam in the lower subsoil.

The root zone is deep. Moisture-supplying capacity is moderate to high, and natural fertility is moderately high. Permeability is moderate to moderately rapid in the subsoil.

Chert fragments make the Humphreys soils somewhat difficult to till. They can be cultivated throughout a wide range of moisture content without clodding and crusting. Most areas of these soils are used for cultivated crops and pasture.

Representative profile of Humphreys cherty silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine, granular structure; very friable; chert content about 15 to 20 percent, by volume; slightly acid; clear, smooth boundary; 4 to 10 inches thick.

B1t—8 to 16 inches, brown (7.5YR 4/4), cherty light silty clay loam; weak, medium, subangular blocky structure; friable; few thin clay films; few, small, black and brown concretions; chert content 15 to 25 percent, by volume; medium acid; gradual, smooth boundary; 4 to 10 inches thick.

B21t—16 to 22 inches, yellowish-brown (10YR 5/6) cherty silty clay loam; moderate, medium, subangular blocky structure; slightly firm; common clay films; few, small, black and brown concretions; chert content about 25 percent, by volume; medium acid; gradual, smooth boundary; 4 to 10 inches thick.

B22t—22 to 32 inches, yellowish-brown (10YR 5/8) cherty silty clay loam; moderate, fine and medium, subangular blocky structure; slightly firm; common clay films; few, small, brown concretions; chert content 30 to 45 percent, by volume; medium acid; clear, smooth boundary; 8 to 12 inches thick.

C—32 to 37 inches +, stratified beds of sand, silt, chert, and gravel; 1 to 3 feet thick.

The Ap horizon ranges from dark brown (10YR 3/3) to very dark grayish brown (10YR 3/2). Common colors of the B1t horizon are yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/4), or, in some places, strong brown (7.5YR 5/6). The texture of the B1t horizon is silt loam in some places. The B21t horizon is commonly yellowish brown (10YR 5/4) or strong brown (7.5YR 5/6). The B22t horizon is commonly yellowish brown (10YR 5/4) or brown (7.5YR 4/4). In some places a few mottles occur in the B22t and C horizons.

The solum is about 20 to 42 inches thick. The chert content of the A and B horizons is about 15 to 45 percent, by volume. The alluvium ranges from about 3 to 10 feet in thickness.

The Humphreys soils are associated with the Tarklin and Dickson soils, which are moderately well drained, and with the Baxter soils, which are well drained. They are better drained than the Tarklin and Dickson soils, and they do not have a fragipan. They are less red and less clayey than the Baxter soils.

Humphreys cherty silt loam, 2 to 6 percent slopes (HuB).—This soil has the profile described as representative for the series. The soil occupies stream terraces, alluvial fans, and foot slopes. The organic-matter content is medium.

Mapped with this soil are small areas that are slightly more eroded than this soil. The surface layer of these inclusions is slightly thinner and lighter colored than the surface layer of this soil.

This Humphreys soil is suited to all crops commonly grown in the county. There is a moderate erosion hazard when it is used for cultivated crops. (Capability unit IIe–11; woodland group 1)

Humphreys cherty silt loam, 6 to 12 percent slopes, eroded (HuC2).—This sloping soil has a profile similar to that described for the series. Its plow layer, however, contains some subsoil material and is less friable than the plow layer of the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas that are slightly less eroded. The surface layer of these inclusions is slightly thicker than the surface layer of this soil. Also included is a small acreage from which most of the original surface soil has been removed by erosion. The plow layer of this inclusion is lighter colored and finer textured than the plow layer of this soil.

This Humphreys soil is suited to all the crops commonly grown in the county, but there is a severe erosion hazard when it is used for cultivated crops. (Capability unit IIIe–6; woodland group 1)

Made Land

Made land (Ma) is a miscellaneous land type that consists of areas where the original soil profile has been changed by man. These areas surround the Barren River Reservoir and include spillways, roads, deep fills and cuts, borrow pits, and graded sites. The soil has been moved, reworked, or graded by major earth-moving operations. Made land in most places ranges from gently to strongly sloping. Some small areas are nearly level. A narrow, steep escarpment is near the edge of Made land in some places. Slightly graded areas in or near an airport, towns, and subdivisions are not included with Made land in mapping.

The characteristics of the natural soil profile have been destroyed in all or nearly all of the areas of Made land. The soil materials are mainly silty clay loam, silty clay, or heavy silt loam. In some places chert or shale is included. (Not placed in a capability unit; woodland group 10)

Melvin Series

The Melvin series consists of poorly drained, level soils of the flood plains and large upland depressions. These soils formed in alluvial materials. These materials washed from soils derived chiefly from limestone and, to a lesser extent, from shale and sandstone.

The surface layer is very friable silt loam that is gray mottled with dark gray and yellowish brown. The subsoil is friable silt loam, also gray mottled with brown. About 22 inches below the surface, there is a gradual transition to gray, massive, slightly firm heavy silt loam.

Reaction is slightly acid to neutral. Moisture-supplying capacity is very high, and natural fertility is moderate. Permeability is moderate. The water table sometimes lies a foot or less below the surface. This subjects the soils to flooding and standing water.

The closeness of the water table to the surface during rainy seasons often makes cultivation of the Melvin soils impracticable. It is very hard to drain these soils because suitable sites for outlets are lacking. About two-thirds of the acreage is wooded. Some of the acreage is in pasture, is under cultivation, or is idle. When artificially drained, the Melvin soils are suitable for growing row crops, but planting is usually delayed. They are suitable for pasture and for growing trees tolerant of wet soil.

Representative profile of Melvin silt loam:

Ap—0 to 10 inches, gray (10YR 5/1) silt loam; common, fine, faint mottles of dark gray (10YR 4/1) and yellowish brown (10YR 5/6 to 5/8); weak, fine, granular structure; very friable; slightly acid; gradual, smooth boundary; 6 to 10 inches thick.

Bg—10 to 22 inches, gray (10YR 6/1 to 5/1) silt loam; common, fine, faint mottles of pale brown (10YR 6/3), brown (10YR 5/3), pale olive (5Y 6/3), and dark reddish brown (5YR 3/3); weak, fine, granular and weak, medium, angular blocky structure; friable; slightly acid; gradual, smooth boundary; 7 to 16 inches thick.

Cg—22 to 44 inches +, gray (10YR 5/1) heavy silt loam; many, fine and medium, distinct mottles of pale brown (10YR 6/3), yellowish brown (10YR 5/6), and reddish brown (5YR 4/3); massive; slightly firm; common, dark-brown concretions scattered throughout; slightly acid; 2 to several feet thick.

Colors in the Ap horizon range from light brownish gray (10YR 6/2) to dark gray (N 4/0). The Bg and Cg horizons have dominant chroma of 2 or less and, in most places, values of 5 or 6.

Thin layers of moderately coarse to moderately fine textured material may be evident in any profile of Melvin soils. The part between the Ap horizon and a depth of about 36 inches below the surface, however, is dominantly medium textured. Mottling throughout the profile is normal. Reaction is generally neutral to slightly acid in most places but ranges to medium acid in some places. A few small chert fragments or pebbles and concretions occur throughout the solum in some places.

The Melvin soils are associated with the Hamblen soils, which are moderately well drained; with the Newark soils, which are somewhat poorly drained; and with the Roellen soils, which are very poorly drained. They are lighter colored, grayer, and more poorly drained than the Hamblen and Newark soils. They lack the thick, very dark Ap and A1 horizons of the Roellen soils and are less clayey than the Roellen soils.

Melvin silt loam (0 to 2 percent slopes) (Me).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is low.

Use of this soil is severely limited by poor drainage and the hazard of frequent overflow. Areas that can be drained economically are suitable for cultivation. (Capability unit IIIw-5; woodland group 7)

Morganfield Series

The Morganfield series consists of well-drained, nearly level soils on flood plains. These soils formed in alluvium that washed from upland soils underlain by limestone and, to a lesser extent, from soils underlain by sandstone and shale.

The surface layer is brown, very friable silt loam. The upper subsoil is brown, friable silt loam. There is a gradual transition to dark yellowish-brown, friable silt loam in the lower subsoil.

Reaction is slightly acid to neutral. The root zone is deep. Moisture-supplying capacity is very high, and natural fertility is high. Permeability is moderate. Morganfield soils occupy low positions adjacent to streams and are subject to occasional flooding.

The Morganfield soils are easily tilled throughout a wide range of moisture content without clodding or crusting. They are suitable for growing all crops commonly grown in the county. Most areas are cultivated or used for pasture and hay crops. A small percentage of the acreage of Morganfield soils is wooded.

Representative profile of Morganfield silt loam:

Ap—0 to 10 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; neutral; gradual, smooth boundary; 6 to 12 inches thick.

B1—10 to 18 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; slightly acid; gradual, smooth boundary; 6 to 14 inches thick.

B2—18 to 48 inches +, dark yellowish-brown (10YR 4/4) silt loam; few fine flecks of pale brown (10YR 6/3); weak, fine and medium, granular structure; friable; slightly acid; about 1 to 3 feet thick.

The Ap horizon ranges to dark grayish brown (10YR 4/2) in some places. In some places the B1 horizon is dark yellowish brown (10YR 4/4) and brown (10YR 5/3). The B2 horizon is brown (7.5YR 4/4) and dark brown (10YR 4/3) in some places. Flecks of reddish brown, strong brown, and pale brown are present in this horizon in places.

The texture throughout the profile is generally silt loam, but a few small pebbles or pockets of sand are present in some places. The soil is free of mottles to a depth of 30 inches or more below the surface. Reaction is commonly neutral to slightly acid but is medium acid in some places.

The Morganfield soils are associated with the Hamblen soils, which are moderately well drained, and the Newark soils, which are somewhat poorly drained. They are better drained and free of mottling to greater depths than the Hamblen and Newark soils.

Morganfield silt loam (0 to 2 percent slopes) (Mf).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is medium.

This soil is especially suited to crops requiring intensive cultivation, including burley tobacco, but there is a hazard of occasional flood damage to crops growing on it. (Capability unit I-1; woodland group 5)

Mountview Series

The Mountview series consists of deep, well-drained, acid soils of the uplands. These soils developed in part from loess material that overlies residual material from cherty limestone.

The surface layer is brown, very friable silt loam. The upper subsoil is yellowish-brown, friable silt loam that grades to strong-brown, friable to firm heavy silt loam and firm silty clay loam in the lower subsoil.

The root zone is deep. Moisture-supplying capacity is high, and natural fertility is moderate. Reaction is medium to very strongly acid. Permeability is moderate.

The Mountview soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Most of the acreage is used for cultivated crops and pas-

ture. A small acreage is in woods, and a small acreage is idle.

Representative profile of Mountview silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; medium acid; gradual, smooth boundary; 6 to 10 inches thick.

B1—8 to 16 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; medium acid; gradual, smooth boundary; 4 to 12 inches thick.

B2t—16 to 32 inches, strong-brown (7.5YR 5/6) heavy silt loam; moderate, medium, subangular blocky structure; friable; few clay films; very strongly acid; clear, wavy boundary; 9 to 18 inches thick.

IIB3t—32 to 40 inches +, strong-brown (7.5YR 5/6) silty clay loam; common, medium, distinct variegations of yellowish red (5YR 5/6), yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/2); strong, medium, angular blocky structure; firm; common clay films; few small chert fragments; very strongly acid; 10 to 24 inches thick.

In some places the Ap horizon ranges to yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2). In some places the B1 horizon ranges to light yellowish brown (10YR 6/4). The B2t horizon in some places is yellowish brown (10YR 5/6). The texture of this horizon ranges from silt loam to silty clay loam. In some places the IIB3t horizon is very firm silty clay.

The solum is about 30 to 60 inches thick. Depth to bedrock is about 4 to 8 feet. The part of the solum formed in loess commonly is about 30 inches thick, but the range is from about 15 to 40 inches.

The Mountview soils are associated with the Dickson and Sango soils, which are moderately well drained, and the Crider soils, which are well drained. They are better drained than the Dickson and Sango soils and lack the well-developed fragipan of the Dickson and Sango soils. They are lighter colored throughout the profile and have a more yellow hue throughout the B horizon than the Crider soils.

Mountview silt loam, 2 to 6 percent slopes (MoB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies somewhat broad ridgetops. The organic-matter content is low.

Included with this soil in mapping are small areas where the original surface soil is mixed with subsoil. These inclusions are less friable and lighter colored in the surface layer than this soil. In some places there is a thin (less than 4 inches), compact, fragipanlike layer about 26 to 30 inches below the surface.

This Mountview soil is suited to all crops commonly grown in the county. There is a moderate erosion hazard when it is used for cultivated crops. (Capability unit IIe-1; woodland group 1)

Mountview silt loam, 6 to 12 percent slopes, eroded MoC2).—This sloping soil has a profile similar to that described for the series. Its plow layer, however, contains some subsoil material and is less friable and lighter colored than the plow layer of the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas that are uneroded and are more friable in the surface layer than this soil. Also included are a few small areas that are severely eroded and that have a plow layer consisting mostly of subsoil material.

This Mountview soil is suited to most of the crops commonly grown in the county, but there is a severe erosion hazard when it is used for cultivated crops. (Capability unit IIIe-1; woodland group 1)

Needmore Series

The Needmore series consists of acid, well-drained soils of the uplands. These soils developed in residual material from argillaceous limestone and calcareous shale.

The surface layer is grayish-brown, very friable silt loam. The upper subsoil is yellowish-brown, firm silty clay that grades to very firm, variegated red and strong-brown silty clay at a depth of about 22 inches.

The root zone is moderately deep to shallow. Moisture-supplying capacity is moderate to low, and natural fertility, moderately low to low. Reaction is medium acid to strongly acid in the B horizon and about neutral in the C horizon. Permeability is moderately slow.

About 75 percent of the acreage of the Needmore soils is used for row crops, hay, and pasture. Some of the rest is wooded, and some is idle.

Representative profile of Needmore silt loam, 2 to 6 percent slopes:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary; 6 to 9 inches thick.

B1t—7 to 13 inches, yellowish-brown (10YR 5/4) silty clay; moderate, medium, angular blocky structure; firm; few clay films; strongly acid; gradual, smooth boundary; 4 to 8 inches thick.

B2t—13 to 22 inches, yellowish-brown (10YR 5/8) silty clay; few, fine, distinct, yellowish-red (5YR 4/8) and light yellowish-brown (10YR 6/4) variegations; strong, medium, angular blocky structure; very firm, very sticky, very plastic; many clay films; strongly acid; gradual, smooth boundary; 7 to 14 inches thick.

B3t—22 to 28 inches, variegated strong-brown (7.5YR 5/8), yellowish-red (5YR 5/6), and light yellowish-brown (10YR 6/4) silty clay; variegations are many, medium, distinct; strong, fine and medium, angular blocky structure; very firm, very sticky, very plastic; common clay films; strongly acid; gradual, wavy boundary; 5 to 9 inches thick.

C—28 to 36 inches, variegated yellowish-brown (10YR 5/8), strong-brown (7.5YR 5/6), reddish-yellow (7.5YR 6/6), and light olive-gray (5Y 6/2) clay; weak, coarse, blocky structure to massive; very firm, very sticky, very plastic; common fragments of gray, calcareous shale or shaly limestone; neutral; 5 to 12 inches thick.

R—36 inches +, bedrock, partially weathered, calcareous shale or shaly limestone.

In some places the Ap horizon ranges to grayish brown (10YR 4/2), brown (10YR 5/3), or yellowish brown (10YR 5/4). The texture of this horizon is dominantly silt loam but is finer in eroded areas. In some places the B2t horizon is dominantly brown to dark brown (7.5YR 4/4) or light olive brown (2.5Y 5/4). The B3t and C horizons contain chert fragments and dark concretions in some places.

The solum ranges from about 17 to 30 inches in thickness. Depth to bedrock ranges from about 24 to 40 inches.

The Needmore soils are associated with the Garmon soils, which are somewhat excessively drained, and with the Mountview soils, which are well drained. They are more clayey in the subsoil, more acid throughout the solum, and less shaly than the Garmon soils. They have a thinner solum and are more clayey in the subsoil than the Mountview soils.

Needmore silt loam, 2 to 6 percent slopes (NdB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies moderately broad ridgetops. It has a moderately deep root zone, moderate moisture-supplying capacity, and moderately low natural fertility. The organic-matter content is low.

Included with this soil in mapping are small areas where the surface layer is less friable, finer textured, and lighter colored than the surface layer of this soil. Also included

are some areas where about 5 to 10 percent of the subsoil, by volume, is shale fragments, and the subsoil is less clayey than the subsoil of this soil.

This Needmore soil is easily tilled over a wide range of moisture content without clodding or crusting. It is suited to growing most of the crops raised in the county. There is a severe erosion hazard when it is used for cultivated crops. (Capability unit IIIe-14; woodland group 8)

Needmore silty clay loam, 6 to 12 percent slopes, eroded (NeC2).—This soil has a profile similar to that described for the series. Its plow layer, however, is less friable, lighter colored, and finer textured than the plow layer in the described profile. It occupies sloping ridgetops. It has a moderately deep root zone, moderate to low moisture-supplying capacity, and low natural fertility. The organic-matter content is low.

Included in mapping of this soil are small areas that have a more friable surface layer than this soil and a less clayey subsoil, 5 to 10 percent of which, by volume, is shale fragments.

The moderate content of clay in the plow layer makes this Needmore soil difficult to till. There is a very severe hazard of erosion when this soil is cultivated. This soil is suitable for occasional growing of row crops, although yields are often low. It is suitable for pasture and for growing trees and producing food and cover for wildlife. (Capability unit IVe-8; woodland group 8)

Needmore silty clay, 6 to 12 percent slopes, severely eroded (NmC3).—This sloping, severely eroded soil has a profile similar to that described for the series. The plow layer, however, is mostly subsoil material of yellowish-brown, firm silty clay. There are many shallow gullies. The root zone is shallow. Natural fertility is low. The organic-matter content is very low.

Included with this soil in mapping in some places is a soil that is 10 to 20 percent shale fragments, by volume, and has a B horizon that is less clayey than the B horizon of this soil.

The clay content of the plow layer makes tillage of this Needmore soil very difficult. The results of erosion and a hazard of additional erosion make the soil unsuited to cultivation. It is suited to pasture and to growing trees and providing food and cover for wildlife. (Capability unit VIe-2; woodland group 3)

Newark Series

The Newark series consists of nearly neutral, somewhat poorly drained soils on the flood plains and in depressions in the uplands. These soils formed in materials washed chiefly from soils underlain by limestone and, to a lesser extent, from soils underlain by sandstone and shale.

The surface layer is brown, very friable silt loam. The upper subsoil is light brownish-gray, friable silt loam with mottles of brown and yellowish brown. The lower subsoil is grayish-brown, friable silt loam. The substratum, below a depth of about 22 inches, is mottled dark grayish-brown, grayish-brown, and light brownish-gray silt loam that is massive.

The root zone is deep. Moisture-supplying capacity is very high, and natural fertility, moderately high. Permeability is moderate. The water table rises to within ½ to 1 foot of the surface during winter and early in spring. The Newark soils are subject to occasional flooding during the growing season.

Most of the acreage is used for hay, pasture, and some corn. Some small areas are in trees. The high water table delays planting of spring crops unless these soils are artificially drained. If artificially drained, these soils are suitable for intensive cultivation.

Representative profile of Newark silt loam:

Ap—0 to 9 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; mildly alkaline; clear, smooth boundary; 6 to 10 inches thick.

B1g—9 to 15 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, distinct mottles of brown (10YR 5/3) and yellowish brown (10YR 5/8); weak, fine, granular structure; friable; neutral; gradual, smooth boundary; 3 to 7 inches thick.

B2g—15 to 22 inches, grayish-brown (2.5Y 5/2) silt loam; common, fine, faint and distinct mottles of brown (10YR 5/3) and yellowish brown (10YR 5/8); weak, fine, granular structure; friable; neutral; clear, smooth boundary; 5 to 10 inches thick.

C1g—22 to 40 inches, mottled dark grayish-brown (10YR 4/2), grayish-brown (10YR 5/2), and light brownish-gray (2.5Y 6/2) silt loam; many, fine and faint mottles; massive; friable; common, fine and medium, dark-brown concretions; neutral; gradual, smooth boundary; 8 to 24 inches thick.

C2g—40 to 44 inches +, primarily a chert bed; dark grayish-brown (10YR 4/2) and black (10YR 2/1) silt and sand coatings; 1 to several feet thick.

In some places the Ap horizon ranges to grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2). Chromas of gray in the B1g and B2g horizons range from 1 to 2. Base colors of the C1g and C2g horizons range from neutral (N 5/0 or 6/0) to chromas of 2.

There are thin layers in some places that are coarser than silt loam or as fine as silty clay loam. Reaction ranges from slightly alkaline to slightly acid for the most part but is medium acid in some places.

The Newark soils are associated with the Hamblen soils, which are moderately well drained, and with the Melvin soils, which are poorly drained. They are more poorly drained, and in the upper part of the B horizon are more mottled and grayer, than the Hamblen soils. They are less gray, at least in the upper part of the profile, and better drained than the Melvin soils.

Newark silt loam (0 to 2 percent slopes) (Nn).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is medium to low.

Mapped with this soil are small areas where the soil has a finer textured solum than this soil but is similar to it in other respects.

Even when this Newark soil is artificially drained, wetness remains a moderate limitation to growing row crops. Pasture and hay crops that tolerate wet soil for a long time can be grown on this soil without artificial drainage. (Capability unit IIw-4; woodland group 7)

Nolichucky Series

The Nolichucky series consists of deep, well-drained soils that developed in colluvium from soils of limestone and sandstone origin. These soils are on foot slopes at the base of knoblike hills.

The surface layer is brown, friable fine sandy loam. The upper subsoil is yellowish-red, friable light clay loam and sandy clay loam. There is a gradual transition to yellowish-red to reddish-brown and dark-red, slightly firm loam in the lower subsoil.

The root zone is deep. Moisture-supplying capacity is high, and natural fertility is moderately high. Reaction is neutral to strongly acid. Permeability is moderate.

The Nolichucky soils are easy to till and can be cultivated throughout a wide range of moisture content without clodding or crusting. Most of the acreage is used for row crops, hay, and pasture. Some is wooded. The Nolichucky soils are well suited to all crops commonly grown in the county.

Representative profile of Nolichucky fine sandy loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; friable; neutral; clear, smooth boundary; 6 to 10 inches thick.

B1t—8 to 14 inches, yellowish-red (5YR 4/6) light clay loam; weak, subangular blocky structure; friable; few thin clay films; few, small, black concretions; neutral; clear, smooth boundary; 4 to 8 inches thick.

B21t—14 to 24 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; few thin clay films; strongly acid; clear, smooth boundary; 8 to 14 inches thick.

B22t—24 to 32 inches, yellowish-red (5YR 4/6) to reddish-brown (5YR 4/4) loam; moderate, fine and medium, subangular blocky structure; slightly firm; few thin clay films; fine, white (10YR 8/2) flecks of chert are scattered throughout the horizon and are very noticeable when the soil is dry; few, small, black concretions; strongly acid; gradual, smooth boundary; 6 to 12 inches thick.

B23t—32 to 68 inches +, dark-red (2.5YR 3/6) loam; moderate, fine, subangular blocky structure; slightly firm; few thin clay films; white flecks of chert as in B22t horizon; few small chert fragments; few, small, black concretions; strongly acid; about 2 to 5 feet thick.

The Ap horizon is normally brown (10YR 4/3) but ranges to dark reddish brown (5YR 3/4). The texture of this horizon is dominantly fine sandy loam but ranges to silt loam or loam. The B1t horizon is reddish brown (5YR 4/4) in some places. The texture of the B horizon is variable and is clay loam, sandy clay loam, or loam.

The thickness of colluvial deposits ranges from about 2 to 10 feet. The solum is dominantly free of chert, but chert makes up 5 to 10 percent of the volume of the B23t horizon in some places.

The Nolichucky soils are associated with the Christian silt loam soils and the Crider and Pembroke soils, all of which are well drained. They are more sandy and less clayey than the Christian soils. They are more sandy and redder in the upper subsoil than the Crider soils. They are more sandy throughout the solum than the Pembroke soils.

Nolichucky fine sandy loam, 2 to 6 percent slopes (NoB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies foot slopes. The organic-matter content is medium.

Included with this soil in mapping are small, moderately eroded areas where the surface layer is slightly thinner and lighter colored than the surface layer of this soil. Also included are small areas that have a cherty surface layer but otherwise are similar to this soil.

This Nolichucky soil is very suitable for growing alfalfa, burley tobacco, and other crops common to the county. There is a moderate hazard of erosion when cultivated crops are grown. (Capability unit IIe–1; woodland group 1)

Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded (NoC2).—This sloping soil has a profile similar to that described for the series. The plow layer, however, contains some subsoil material and is lighter colored than the plow layer of the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas that have the original surface layer, which is darker and thicker than the surface layer of this soil. Also included are very small areas that have a cherty surface layer but otherwise are similar to this soil.

This soil is suitable for all the crops commonly grown in the county, but there is a severe erosion hazard when it is used for cultivated crops. (Capability unit IIIe–1; woodland group 1)

Pembroke Series

The Pembroke series consists of well-drained soils of the limestone uplands. These soils developed, in part, from parent material containing a small amount of loess.

The surface layer is dark-brown, very friable silt loam. The upper subsoil is yellowish-red to red, slightly firm to firm light silty clay loam that grades to dark-red, firm heavy silty clay loam to silty clay in the lower subsoil.

The root zone is deep. Moisture-supplying capacity and natural fertility are high. Reaction is medium to very strongly acid. Permeability is moderate.

The Pembroke soils, except those that are severely eroded, are easily tilled throughout a wide range of moisture content without clodding and crusting. Most areas of Pembroke soils are used for tobacco, corn, small grain, alfalfa, hay, and pasture (fig. 8). Originally they were forested with hardwoods. The Pembroke soils are suitable for growing all crops common to the county.

Representative profile of Pembroke silt loam, 2 to 6 percent slopes:

Ap—0 to 9 inches, dark-brown (7.5YR 3/2) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary; 5 to 10 inches thick.

B1t—9 to 18 inches, yellowish-red (5YR 4/6) light silty clay loam; moderate, medium, subangular blocky structure; few peds are coated with pale-brown (10YR 6/3) silt; slightly firm; few thin clay films; few, small, black and brown concretions; medium acid; clear, smooth boundary; 6 to 12 inches thick.

B21t—18 to 28 inches, red (2.5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; firm; few

Figure 8.—Beef cattle on a Pembroke silt loam pasture.

clay films; few peds are thinly coated with pale-brown (10YR 6/3) silt; few, small, brown concretions; strongly acid; gradual, smooth boundary; 6 to 12 inches thick.

B22t—28 to 34 inches, dark-red (2.5YR 3/6) heavy silty clay loam; few faint variegations of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; firm; common clay films; few, small, brown and black concretions; strongly acid; gradual, smooth boundary; 5 to 15 inches thick.

B23t—34 to 50 inches +, dark-red (10R 3/6) silty clay; common, distinct variegations of strong brown (7.5YR 5/6 to 5/8); moderate, medium, subangular blocky structure; firm; common clay films; few, small, black and brown concretions; very strongly acid; about 1 to 3 feet thick.

In some places the Ap horizon ranges to dark brown (10YR 3/3) and dark reddish brown (5YR 3/2 to 3/3). The B21t horizon ranges to reddish brown (2.5YR 4/4) and dark red (2.5YR 3/6). In some places the B22t horizon is dark red (10R 3/6) and red (2.5YR 4/6 or 10R 4/6). The B22t horizon is silty clay in some places.

The depth to bedrock is about 6 to 10 feet. The solum ranges to 5 feet or more in thickness.

The Pembroke soils are associated with the Cumberland, Crider, Christian, and Nolichucky soils, which are well drained. They are less cherty, less red, and less clayey in the upper subsoil than the Cumberland soils. They are redder and more clayey in the upper subsoil than the Crider soils. They have less sand and are less clayey in the upper subsoil than the Christian soils. They are less sandy throughout the solum and redder in the lower part of the profile than the Nolichucky soils.

Pembroke silt loam, 2 to 6 percent slopes (PbB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies broad ridges. The organic-matter content is medium.

Included with this soil in mapping are a few small areas that have slopes of 0 to 2 percent. Also included are some areas where the original surface soil is mixed with subsoil and is less friable and lighter colored than the surface layer of this soil. Included also are small areas that occupy stream terraces and foot slopes and have a lower subsoil that is less red and more friable than that of this soil.

This Pembroke soil is especially suitable for growing alfalfa and burley tobacco. There is a moderate erosion hazard when it is used for cultivated crops. (Capability unit IIe–1; woodland group 1)

Pembroke silt loam, 6 to 12 percent slopes, eroded (PbC2).—This sloping soil has a profile similar to that described for the series. Its plow layer, however, contains some subsoil material and is less friable and lighter colored than the plow layer in the described profile. The organic-matter content is low.

Included with this soil in mapping are small areas where the surface layer is more friable and darker colored than the surface layer of this soil. Also included are small areas that occupy stream terraces and foot slopes and are less red and more friable in the lower subsoil than this soil.

There is a severe erosion hazard when this Pembroke soil is used for cultivated crops. (Capability unit IIIe–1; woodland group 1)

Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded (PeC3).—This sloping soil has a profile similar to that described for the series. The plow layer, however, is slightly redder and finer textured than the plow layer in the described profile. In some places there are many shallow gullies. This soil has a high moisture-supplying capacity and high natural fertility. The organic-matter content is very low.

Included with this soil in mapping are small areas where the surface layer is darker and more friable than the surface layer of this soil.

The moderate content of clay in the plow layer makes this Pembroke soil difficult to till. The results of erosion and the hazard of additional erosion very severely limit use of this soil for growing cultivated crops. The soil is suitable for only occasional cultivation. It is best suited to plants that make a large growth in spring and early in summer. (Capability unit IVe–11; woodland group 3)

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained, sandy soils on side slopes and narrow ridges. These soils are strongly sloping to steep. They developed in sandy residual material from sandstone.

The Ramsey soils have a very friable surface layer. This consists of about 2 inches of dark gray or very dark gray fine sandy loam over about 7 inches of pale-brown fine sandy loam. The subsoil consists of light yellowish-brown, friable fine sandy loam about 8 inches thick over massive sandstone bedrock. Stones, 1 to 2 feet in diameter, and sandstone fragments are common to many over the surface, and coarse fragments, 1/4 inch to 10 inches in diameter, make up about 40 to 60 percent of the profile, by volume.

The root zone is shallow. Moisture-supplying capacity is low to very low, and natural fertility is low. Permeability is moderately rapid to rapid. Reaction is very strongly acid, and organic-matter content is very low.

Most of the acreage of Ramsey soils is wooded. A few small areas are used for pasture and a few small areas are idle.

Representative profile of Ramsey stony fine sandy loam, 20 to 50 percent slopes:

A1—0 to 2 inches, dark gray (10YR 4/1) to very dark gray (10YR 3/1) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; common, small sandstone fragments about 1 to 2 millimeters in diameter and a few larger sandstone fragments; neutral; clear, wavy boundary; 0 to 3 inches thick.

A2—2 to 9 inches, pale-brown (10YR 6/3) fine sandy loam; weak, fine, granular structure; very friable; many sandstone fragments about 2 to 25 millimeters in diameter; few, fine roots; very strongly acid; clear, wavy boundary; 3 to 8 inches thick.

B—9 to 17 inches, light yellowish-brown (10YR 6/4) fine sandy loam; weak, fine and medium, subangular blocky structure; friable; few, fine roots; sandstone fragments 6 to 254 millimeters in diameter; content of sandstone fragments is about 50 percent, by volume; very strongly acid; gradual, wavy boundary; 4 to 9 inches thick.

R—17 inches +, sandstone bedrock.

In some places the A1 horizon ranges to dark grayish brown (10YR 4/2).

The depth to bedrock ranges from about 11 to 22 inches. Stones occupy 10 to 20 percent of the surface. The stones are mostly up to 2 feet across. Some are larger. In some small areas they cover 75 percent or more of the surface. The content of coarse fragments throughout the B horizon ranges from about 40 to 65 percent, by volume.

In Barren County the Ramsey soils are closely associated with the Weikert soils. Ramsey soils are mapped with Weikert soils in two mapping units that are described under the Weikert series.

Robinsonville Series

The Robinsonville series consists of well-drained, gravelly soils of the stream bottoms. These soils consist of alluvial materials that washed chiefly from upland soils underlain by cherty limestone. To a lesser extent, these materials washed from soils underlain by sandstone and shale.

The surface layer is brown, very friable gravelly silt loam. The subsoil is brown, friable gravelly silt loam.

The root zone is deep. Moisture-supplying capacity is moderate, and natural fertility is moderately high. Fertility is replenished by sediments from overflow waters. Permeability of the subsoil is moderately rapid to rapid, depending on the amount, size, and arrangement of gravel.

Because the Robinsonville soils are gravelly, growth of crops is generally retarded by short droughts. These soils are somewhat difficult to till because the plow layer contains gravel. They can be cultivated throughout a wide range of moisture content without clodding or crusting. Most areas are used for cultivated crops, hay, and pasture. Corn is the principal row crop. The Robinsonville soils are suited to most of the crops commonly grown in the county.

Representative profile of Robinsonville gravelly silt loam:

A—0 to 7 inches, brown (10YR 4/3) gravelly silt loam; weak, fine, granular structure; very friable; slightly acid; gradual, smooth boundary; 6 to 12 inches thick.

B—7 to 23 inches, brown (10YR 4/3) gravelly silt loam; weak, medium, granular structure; friable; slightly acid; gravel content is 15 to 20 percent, by volume; gradual, smooth boundary; 6 to 18 inches thick.

C—23 to 38 inches +, brown (10YR 4/3) gravelly silt loam; weak, fine, granular structure to massive; friable; content of chert and quartz gravel is 25 to 40 percent, by volume; slightly acid; about 1 to 3 feet thick.

The Ap horizon is dominantly brown (10YR 4/3) but ranges to dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4). In some places the B and C horizons are brown (10YR 5/3) and dark yellowish brown (10YR 4/4). In a few places they are brown (7.5YR 4/4).

Gravel, sand, and gravel-size chert up to 3 inches in diameter make up 15 to 40 percent of the profile volume and occur throughout the profile. Gravel beds are common more than 4 to 6 feet from the surface. Small pockets of sandy loam soil material are in the subsoil layers in some places. Mottles occur in some places below a depth of 36 inches, but in others they are absent from the profile. Reaction is commonly slightly acid to neutral, but it is medium acid in some places.

The Robinsonville soils are associated with the Morganfield soils, which are well drained, and with the Hamblen soils, which are moderately well drained. They are more gravelly than the Morganfield soils and have more rapid permeability in the subsoil. They have more gravel in the profile than the Hamblen soils and are better drained.

Robinsonville gravelly silt loam (0 to 2 percent slopes) (Rg).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is low in most places.

This soil is suitable for intensive cultivation. The gravelly plow layer, however, and the hazard of occasional flood damage to crops moderately limit its use. The soil is well suited to growing pasture and hay plants that can stand winter floods of short duration. (Capability unit IIs-1; woodland group 5)

Rock Land

Rock land (Ro) is a miscellaneous land type that consists of areas where rock outcrops make up 25 to 90 percent of the surface (fig. 9). These outcrops are mostly limestone. They are adjacent to very rocky Baxter, Fredonia, and Caneyville soils. In many places the profile of a soil between the exposed rocks resembles a profile of Baxter, Fredonia, or Caneyville soils. Some areas of Rock land are on ridgetops, but most are on side slopes. Rock land is mostly strongly sloping to moderately steep.

Included with Rock land in mapping are a few small areas where 90 to 100 percent of the surface is covered by outcropping shaly limestone or calcareous shale.

Most of the acreage of Rock land is wooded. The most common trees are redcedar, oak, and hickory. Some small areas are cleared and are idle or used for very limited grazing. Most areas are suitable only for growing trees and providing food and cover for wildlife. (Capability unit VIIs-5; woodland group 10)

Roellen Series

The Roellen series consists of very poorly drained, slightly acid to neutral, dark soils on flood plains. These soils developed in fine-textured, nearly neutral alluvium.

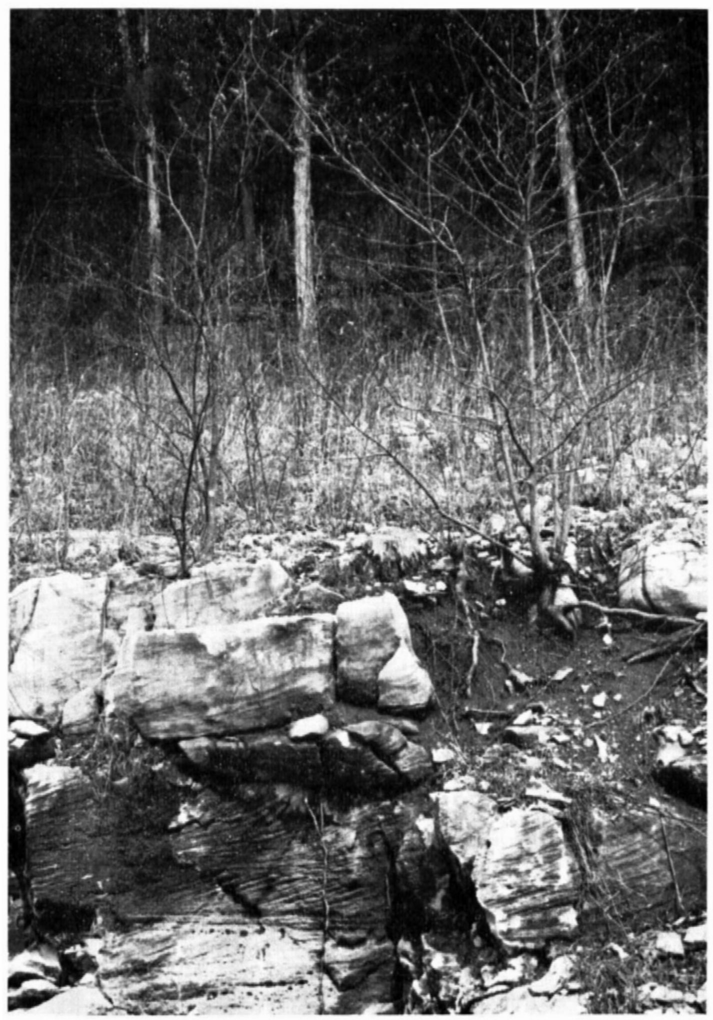

Figure 9.—Rock outcrops occupy up to 90 percent of the surface of Rock land. Rock land is suitable for growing trees and providing food and cover for wildlife.

This alluvium washed mostly from soils of the limestone uplands. To a lesser extent, it washed from soils derived from shale.

The surface layer is very dark gray to black, firm silty clay loam. The subsoil is dark-gray, very firm silty clay. There is a gradual transition to gray, very firm or very plastic silty clay in the substratum.

The root zone is deep. Moisture-supplying capacity is very high. Natural fertility and organic-matter content are high. Permeability is slow in the subsoil. The water table is at or near the surface for long periods during winter and spring.

Their moderately clayey surface layer makes the Roellen soils somewhat difficult to till. Most of the acreage is used for pasture. Some is cultivated, and a small acreage is wooded. These soils are suited to pasture. They are suited to row crops only if they are artificially drained.

Representative profile of Roellen silty clay loam:

A1—0 to 19 inches, very dark gray (10YR 3/1) to black (10YR 2/1) silty clay loam; weak to moderate, fine, granular structure and weak, fine, angular blocky structure; firm; slightly sticky; slightly acid; few, very small, dark-brown concretions and few small chert chips; gradual, smooth boundary; 8 to 20 inches thick.

Bg—19 to 38 inches, dark-gray (5YR 4/1) silty clay; weak, medium, angular blocky structure; very firm, very sticky, plastic, hard; few small chert chips and few small, very dark reddish-brown concretions; slightly acid; gradual, smooth boundary; 10 to 24 inches thick.

Cg—38 to 44 inches +, gray (5Y 5/1) silty clay; common, fine, distinct mottles of olive (5Y 5/3), pale olive (5Y 6/3), and strong brown (7.5YR 5/6); massive; very firm, very plastic, very hard; few sand grains and small dark reddish-brown concretions; neutral; 2 to 5 feet thick.

In some places there is an Ap horizon that is heavy silt loam and is about 8 inches thick. In some places, the Bg horizon has mottles that have hues of 7.5YR and 2.5Y, values of 4 and 5, and chromas of 4 and 6. In many places there are stratified sandy, silty, and clayey layers more than 4 feet below the surface.

The alluvium ranges from 3 to 5 feet or more in thickness over bedrock. Reaction is commonly slightly acid to neutral but ranges to medium acid in some places.

The Roellen soils are associated with the Melvin soils, which are poorly drained, and with the Newark and Taft soils, which are somewhat poorly drained. They are darker in the upper profile, more clayey, and more poorly drained than the Melvin, Newark, and Taft soils.

Roellen silty clay loam (0 to 2 percent slopes) (Rs).—A profile of this soil was described as representative for the series. This soil is almost level and occupies low-lying flood plains. It is subject to frequent flooding.

Even when it is artificially drained, excessive moisture in the root zone during winter and spring, and a flooding hazard, continue to severely limit the use of this soil for growing row crops. In years of average rainfall, this soil is suitable for late-planted crops of corn and soybeans. It is suited to grasses and legumes that can stand wet soil during winter and the early part of the growing season. (Capability unit IIIw-5; woodland group 7)

Sango Series

The Sango series consists of moderately well drained, acid soils of the uplands. These soils developed in residual material from cherty limestone, capped in places with thin loess.

The surface layer is brown, very friable silt loam. The subsoil is light yellowish-brown to olive-yellow, friable silt loam that grades to a mottled, compact, brittle layer at about 23 inches below the surface.

The root zone is moderately deep. Moisture-supplying capacity is moderate, and natural fertility, moderately low. Reaction is strongly to very strongly acid. Permeability is moderate in the upper subsoil and slow in the fragipan.

The Sango soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Approximately 80 percent of the acreage is used for row crops, hay, and pasture. The rest is wooded.

Representative profile of Sango silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary; 5 to 9 inches thick.

B1—8 to 12 inches, light yellowish-brown (2.5Y 6/4) silt loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary; 3 to 8 inches thick.

B2—12 to 23 inches, olive-yellow (2.5Y 6/6) silt loam; moderate, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary; 8 to 20 inches thick.

Bx1t—23 to 39 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, fine and medium, distinct mottles of yellowish brown (10YR 5/8), light brownish gray (2.5Y 6/2), light gray (2.5Y 7/2), dark gray (5Y 4/1), and dark brown (10YR 3/3); weak, medium, angular and subangular blocky structure to massive; firm, compact, brittle; clay films on coarse peds and vertical faces of polygons; common, small, dark-brown concretions; very strongly acid; gradual, smooth boundary; 12 to 24 inches thick.

Bx2t—39 to 46 inches +, variegated light yellowish-brown (2.5Y 6/4), strong-brown (7.5YR 5/6), yellowish-red (5YR 5/6), yellowish-brown (10YR 5/6), and light-gray (5Y 7/2) silty clay loam; moderate, coarse, blocky structure; firm; few thick clay films; few small chert fragments; very strongly acid; 5 to 20 inches thick.

In some places the Ap horizon ranges to grayish brown (2.5Y 5/2) and dark grayish brown (2.5Y 4/2 to 10YR 4/2). In some places the B2 horizon is light yellowish brown (10YR 6/4). The B2 horizon is commonly silt loam but ranges to light silty clay loam. The Bx1t horizon is silty clay loam in some places.

The depth to the fragipan ranges from about 20 to 26 inches. The fragipan varies in thickness from about 12 to 36 inches. In some places the upper part of the solum developed in a loess mantle that lies over cherty limestone residuum.

The Sango soils are associated with the Mountview soils, which are well drained, and with the Dickson soils, which are moderately well drained. They are slightly more poorly drained, more mottled, and lighter colored in the subsoil than the Dickson soils and have a stronger fragipan than the Dickson soils.

Sango silt loam, 0 to 2 percent slopes (SaA).—This soil has a profile like the one described for the series. It is level to nearly level and occupies uplands. The organic-matter content is low.

Mapped with this soil are small areas of a soil that, in profile, is similar to the Sango soil and developed in loess or in residuum derived from sandstone, siltstone, and shale.

A water table above the slowly permeable fragipan during winter and early in spring moderately limits use of this Sango soil for row crops. The tendency for surface water to pond on the more level areas also moderately limits the use of this soil for such crops. This soil is suited to grasses and legumes, except alfalfa, which dies out in 1 or 2 years. (Capability unit IIw-1; woodland group 6)

Sango silt loam, 2 to 6 percent slopes (SaB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies broad ridges. The organic-matter content is low.

Mapped with this soil are small areas that have the original surface soil mixed with the subsoil. In these areas the surface layer is lighter colored and slightly less friable than the surface layer of this soil.

This Sango soil is suitable for most of the crops commonly grown in the county, but the fragipan layer restricts root growth and drainage. There is a moderate erosion hazard when this soil is cultivated. (Capability unit IIe-10; woodland group 6)

Staser Series

The Staser series consists of well-drained, nearly neutral soils that formed in soil material that was washed chiefly from soils underlain by limestone. These soils occupy bottoms of depressions or sinks and also occupy flood plains along small drainageways. They range in gradient from about 0 to 3 percent.

The surface layer is dark-brown, very friable silt loam. The subsoil is dark-brown, friable silt loam. A few mottles of light brownish gray normally occur more than 36 inches from the surface.

The root zone is deep. Moisture-supplying capacity and natural fertility are high. Permeability is moderate. The Staser soils are subject to occasional short floods because they are in low places.

The Staser soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Most areas are cultivated or pastured. The Staser soils are well suited to most of the crops commonly grown in the county. Overflow water occasionally damages crops.

Representative profile of Staser silt loam:

Ap—0 to 12 inches, dark-brown (7.5YR 3/2) silt loam; weak, granular structure; very friable; slightly acid; gradual, smooth boundary; 6 to 14 inches thick.

B21—12 to 36 inches, dark-brown (7.5YR 3/2) silt loam; moderate, fine, granular structure; friable; slightly acid; gradual, smooth boundary; 8 to 24 inches thick.

B22—36 to 48 inches +, dark-brown (7.5YR 3/2-4/4) silt loam; few, fine, distinct mottles of light brownish gray (10YR 6/2); weak, fine and medium, granular structure; friable; neutral; about 1 to 4 feet thick.

In general, the Ap horizon ranges from dark brown (7.5YR 3/2 to 10YR 3/3) to dark yellowish brown (10YR 3/4). In some depressed areas, however, where the Staser soils are associated with red soils of the uplands, the Ap horizon is dark reddish brown (5YR 3/3). Dominant hues in the B21 and B22 horizons are 7.5YR and 10YR.

Stratification of sediments is evident in some places, but the dominant texture is silt loam. Mottles are lacking to a depth of more than 4 feet in some places. Reaction ranges from slightly acid to neutral.

The Staser soils are associated with the Hamblen soils, which are moderately well drained, and with the Newark soils, which are somewhat poorly drained. They are better drained and less mottled than the Hamblen and Newark soils.

Staser silt loam (0 to 2 percent slopes) (St).—A profile of this soil was described as representative for the series. The organic-matter content of this soil is medium.

Mapped with this soil are a few small areas of a soil that is in sinks and that is slightly coarser in profile than this soil but is otherwise similar to it.

This Staser soil is suitable for intensive cultivation of most row crops. Excellent yields of forage crops can be obtained on it. (Capability unit I-1; woodland group 5)

Taft Series

The Taft series consists of nearly level, somewhat poorly drained, acid soils on stream terraces and upland flats. These soils developed in residual or alluvial material that was derived chiefly from limestone and partly from sandstone or shale.

These soils have a surface layer of grayish-brown, mottled, very friable silt loam. The upper subsoil is friable silt loam that is light yellowish brown and is mottled. There is a gradual transition to a mottled, compact, brittle layer at about 16 inches below the surface.

The depth of root zone is restricted by the fragipan. Moisture-supplying capacity is moderate, natural fertility is moderately low, and organic-matter content is low. For the most part, reaction is very strongly acid. Permeability of the upper part of the subsoil is moderate, but permeability of the fragipan is slow.

The Taft soils are easily tilled throughout a wide range of moisture content without clodding or crusting. The fragipan causes the upper subsoil to remain saturated with water during winter and part of spring. About 70 percent of the acreage of Taft soils is used for crops and pasture. The rest is wooded.

Representative profile of Taft silt loam:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint mottles of brown (10YR 5/3); weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary; 6 to 12 inches thick.

B2—8 to 16 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, fine, distinct mottles of light olive brown (2.5Y 5/4), yellowish brown (10YR 5/4), and light brownish gray (10YR 6/2); weak, fine and medium, subangular blocky structure; friable; few, small, brown, soft concretions; very strongly acid; gradual, smooth boundary; 6 to 12 inches thick.

Bx1—16 to 21 inches, pale-yellow (5Y 7/3) heavy silt loam; common, fine and medium, distinct mottles of light gray (5Y 7/1), yellowish brown (10YR 5/4), and strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; slightly firm, compact, brittle; few, small, brown concretions; very strongly acid; clear, smooth boundary; 4 to 12 inches thick.

Bx2—21 to 42 inches +, mottled light-gray (5Y 7/2), pale-yellow (5Y 7/3), yellowish-brown (10YR 5/6), and pale-olive (5Y 6/3) heavy silt loam; weak, coarse, blocky structure; firm, compact, brittle; few thick clay flows; common, small, black and dark-brown concretions; very strongly acid; about 14 to 28 inches thick.

In some places the Ap horizon ranges to dark grayish brown (2.5Y 4/2) or grayish brown (2.5Y 5/2) and is mottled. In some places there is a B1 horizon that is light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) or pale olive (5Y 6/3) and is mottled. In some places the B2 horizon has matrix colors of pale olive (5Y 6/3) and light yellowish brown (2.5Y 6/4) and is mottled with yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2). Textures of the Bx1 and Bx2 fragipan horizons are silt loam, heavy silt loam, or silty clay loam.

The depth to the fragipan ranges from about 12 to 19 inches. The thickness of the fragipan is 2 to 3 feet or more. The depth to bedrock ranges from 6 to 10 feet or more.

The Taft soils are associated with the Sango and Dickson soils, which are moderately well drained, and with the Melvin and Dowellton soils, which are poorly drained. They are more mottled, especially in the upper part of the profile, and more poorly drained than the Sango and Dickson soils. They

are better drained and less gray throughout the profile than the Melvin and Dowellton soils. They have a coarser textured subsoil than the Dowellton soils.

Taft silt loam (0 to 2 percent slopes) (Ta).—A profile of this nearly level soil was described as representative for the series. This soil occupies stream terraces and uplands.

This soil can be cultivated if it is drained, but drainage is difficult because runoff is slow and the fragipan is slowly permeable. It is well suited to pasture and hay plants that are tolerant of a wet soil. (Capability unit IIIw–1; woodland group 7)

Talbott Series

The Talbott series consists of well-drained, clayey soils on uplands. These soils are gently sloping to strongly sloping. They developed in residual material from limestone and shale.

The surface layer of those Talbott soils that are cherty is strong-brown, firm cherty silty clay loam. The upper subsoil is yellowish-red, very firm cherty silty clay or clay. There is a gradual transition to red, brown, and gray, very firm cherty clay in the lower part of the subsoil. The noncherty Talbott soils have a profile similar to the profile of the cherty Talbott soils in color and texture but free of chert.

The root zone is somewhat restricted in depth by very firm clay that lies at a depth of about 18 inches from the surface. Moisture-supplying capacity is moderate, and natural fertility is moderately high. Reaction is mostly medium acid. Permeability is moderately slow.

The Talbott soils are somewhat difficult to till because of their moderately fine to fine textured surface layer. About 80 percent of the acreage is used for crops, hay, and pasture. The rest is wooded.

Representative profile of Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded:

Ap—0 to 5 inches, strong-brown (7.5YR 5/6) cherty silty clay loam; weak, fine and medium, angular blocky structure; firm; slightly acid; clear, smooth boundary; 3 to 6 inches thick.

B21t—5 to 18 inches, yellowish-red (5YR 4/6) cherty silty clay; moderate to strong, medium, angular blocky structure; very firm, sticky, plastic, hard; common clay films; medium acid; clear, smooth boundary; 10 to 15 inches thick.

B22t—18 to 37 inches, yellowish-red (5YR 4/6) cherty clay; common to many, fine, distinct flecks of strong brown (7.5YR 5/6) and light yellowish brown (10YR 6/4); strong, medium, angular blocky structure; very firm, very sticky, very plastic, very hard; many clay films; chert content about 20 to 30 percent, by volume; medium to slightly acid; clear, smooth boundary; 13 to 22 inches thick.

B3t—37 to 61 inches, variegated yellowish-red (5YR 4/6), strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/8), and light brownish-gray (2.5Y 6/2) cherty clay; variegations are many, medium, and distinct; strong, medium, angular blocky structure; very firm, very sticky, very plastic, very hard; many clay films; chert content about 15 to 20 percent, by volume; medium acid; gradual, smooth boundary; 1 to 3 feet thick.

C—61 to 83 inches +, variegated light olive-brown (2.5Y 5/4), yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), and yellowish-red (5YR 5/6) clay; variegations are many, medium, and prominent; weak, coarse, blocky structure to massive; very firm, very sticky, very plastic; common fragments of chert and soft shale; medium acid; about 1 to 4 feet thick.

In some places the Ap horizon ranges to brown (10YR 4/3 to 5/3). The texture of this horizon in some places is silt loam. In some places the B22t horizon is reddish brown (5YR 4/3) or red (2.5YR 4/6). Throughout the subsoil the texture is commonly clay.

The depth to bedrock ranges from about 3 to 10 feet. In some places there are a few rock outcrops covering less than 2 percent of the surface area. In those Talbott soils that are cherty, the chert content of the A and B horizons ranges from about 15 to 40 percent, by volume. The other Talbott soils are relatively free of chert.

The Talbott soils are associated with the Cumberland and Baxter soils, which are well drained, and with the Christian cherty loam soils. They are lighter colored in the surface layer and less red in the subsoil than the Cumberland soils. They are redder and more clayey in the upper subsoil than the Baxter soils. They are less sandy in the surface layer and upper subsoil than Christian cherty loam soils.

Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded (TbB2).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies ridgetops. The organic-matter content is low.

Included with this soil in mapping are small areas that are slightly less eroded than this soil. These inclusions have a surface layer of brown to dark-brown (10YR 4/3), friable cherty silt loam about 8 inches thick. Also included are small areas where the soil is less red than this soil.

This Talbott soil is fairly well suited to cultivated crops and well suited to hay and pasture. Alfalfa grows well on it. Because water infiltrates slowly into the surface layer and runoff of water is excessive, there is a severe erosion hazard when this soil is cultivated. The chert interferes with tillage. (Capability unit IIIe–14; woodland group 8)

Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded (TbC2).—This sloping soil is on ridges and has a profile like the one described for the series. The organic-matter content is low.

Included with this soil in mapping are a few severely eroded areas and small areas that are less eroded than this soil. Also included is a small acreage of a soil that has a brown subsoil and a solum that is slightly thinner than the solum of this soil.

This Talbott soil is suitable for only occasional cultivation because there is a very severe erosion hazard when it is tilled. It is well suited to hay and pasture. Alfalfa grows well on it. Its content of chert interferes with tillage. (Capability unit IVe–8; woodland group 8)

Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded (TcC3).—This sloping soil has a profile similar to that described for the series. The plow layer, however, consists mostly of subsoil material and is redder and more clayey than the plow layer of the described profile. There are numerous shallow gullies in most places. This soil has a shallower root zone and lower moisture-supplying capacity than the previously described cherty Talbott soils. The organic-matter content is very low.

Included with this soil in mapping are small areas that are slightly less firm, less sticky, and less plastic in the upper subsoil than this soil. Also included is a small acreage of a soil that is browner than this soil.

The results of erosion and the hazard of further erosion make this Talbott soil unsuited to cultivation. This soil can be used for pasture, although yields are generally just fair. It is suitable for plants that make a large growth in spring and early in summer. (Capability unit VIe–2; woodland group 3)

Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded (TbD2).—This soil has a profile like the one described for the series. It is strongly sloping and occupies side slopes. The organic-matter content is low.

Included with this soil in mapping is a small acreage of a soil that has a browner subsoil and a thinner solum than this soil. Also included are a few, small, galled spots where the subsoil is exposed.

Steepness and slow water intake cause excessive runoff of water from this Talbott soil and loss of soil material. Consequently, this soil is not suited to cultivation. It is well suited to pasture and hay crops. (Capability unit VIe-1; woodland group 8)

Talbott silty clay loam, 2 to 6 percent slopes, eroded (TlB2).—This soil is free of chert but in other respects has a profile like the one described for the series. It is gently sloping and occupies ridgetops. The organic-matter content is low.

Included with this soil in mapping are small areas that are less eroded than this soil. These inclusions have a surface layer that is about 8 inches thick and is darker and more friable than the surface layer of this soil.

This Talbott soil is fairly well suited to row crops, but there is a severe erosion hazard when it is cultivated. It is well suited to hay and pasture. Alfalfa grows well on it. (Capability unit IIIe-14; woodland group 8)

Talbott silty clay loam, 6 to 12 percent slopes, eroded (TlC2).—This sloping soil is free of chert but in other respects has a profile like the one described for the series. The organic-matter content is low.

Mapped with this soil are a few, small, galled spots where the subsoil is exposed.

There is a very severe hazard of erosion when this Talbott soil is used for cultivated crops, but the soil is suited to occasional cultivation. It is well suited to hay and pasture. Alfalfa grows well on it. (Capability unit IVe-8; woodland group 8)

Tarklin Series

The Tarklin series consists of moderately well drained, cherty soils of the stream terraces, foot slopes, and uplands. These soils developed in residual material from cherty limestone or in local or general alluvium that, in many places has a high content of chert.

The surface layer is dark grayish-brown, very friable cherty silt loam. The subsoil is yellowish-brown, friable cherty silt loam to cherty silty clay loam that grades to a mottled, compact, brittle layer at about 23 inches below the surface.

The root zone is moderately deep. Moisture-supplying capacity and natural fertility are moderate. Reaction is medium to very strongly acid. Permeability is moderate in the upper part of the subsoil and slow in the fragipan.

The Tarklin soils are somewhat difficult to till because the plow layer contains chert fragments. They can be cultivated throughout a wide range of moisture content without clodding or crusting. Approximately 75 percent of the acreage is used for row crops, hay, and pasture. The rest is wooded. The Tarklin soils are suited to most crop and pasture plants common to the county. Alfalfa generally dies out by the third year on these soils.

Representative profile of Tarklin cherty silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) cherty silt loam; weak, fine, granular structure; very friable; content of chert fragments is 15 to 20 percent, by volume; common roots and pores; neutral; clear, smooth boundary; 5 to 9 inches thick.

B1—8 to 12 inches, yellowish-brown (10YR 5/4 to 5/6) cherty silt loam; weak, fine and medium, subangular blocky structure; friable; content of chert fragments is 20 to 25 percent, by volume; common roots and pores; neutral; clear, smooth boundary; 3 to 6 inches thick.

B2t—12 to 23 inches, yellowish-brown (10YR 5/6) cherty silt loam to silty clay loam; moderate, fine and medium, subangular blocky structure; friable; content of chert fragments is 25 to 30 percent, by volume; few patchy clay films; common roots; very strongly acid; clear, wavy boundary; 9 to 14 inches thick.

Bx1t—23 to 29 inches, brown (7.5YR 4/4) cherty silty clay loam; many, fine, distinct mottles of yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2); polygons break down to medium angular blocks; tongues of gray silt and clay separate the polygons; very firm, compact, brittle; many clay films; content of chert is 20 to 30 percent, by volume; few roots in the tongues; very strongly acid; 4 to 12 inches thick.

Bx2t—29 to 40 inches, mottled yellowish-brown (10YR 5/4), brown (7.5YR 5/4), and light brownish-gray (2.5Y 6/2) silty clay loam; weak, coarse, subangular blocky structure to massive; very firm, somewhat compact and brittle; common clay films; content of chert is about 25 percent, by volume; chert fragments are ½ inch to 2 inches in diameter; many, small, dark-brown concretions; few roots; very strongly acid; clear, smooth boundary; 8 to 15 inches thick.

C1x—40 to 45 inches, mottled light olive-brown (2.5Y 5/4), yellowish-brown (10YR 5/8), and light brownish-gray, (2.5Y 6/2) gritty clay loam; weak, coarse, platy structure to massive; firm, compact, brittle; content of chert is about 30 percent, by volume; chert fragments are ¼ inch to 2 inches in diameter; several, medium-reddish and dark yellowish-brown concretions; few roots; very strongly acid; clear, smooth boundary; 5 to 10 inches thick.

C2—45 to 53 inches +, mottled, medium yellowish-brown (10YR 5/4) and light brownish-gray to light yellowish-brown (2.5Y 6/2 to 6/4) gritty loam; massive; firm and compact in places; content of rounded chert is approximately 45 percent, by volume; chert fragments are from ½ inch to 2 inches in diameter; very strongly acid.

The color of the Ap horizon centers on dark grayish brown (10 YR 4/2) and ranges to pale brown (10YR 6/3) and brown (10YR 5/3). There is no B1 horizon in some places. The color of the B2t horizon centers on yellowish brown (10YR 5/6) and ranges to 10YR 5/4 and light yellowish brown (10YR 6/4). The Bx1t horizon is dominantly light yellowish brown (10YR 6/4) in some places. Mottles are pale brown (10YR 6/3) and brown (10YR 5/3) in some places. The B horizons are cherty silt loam or cherty silty clay loam. The clay content of these horizons averages less than 35 percent. The C horizons are clay loam, silty clay loam, loam, or silty clay.

The depth to bedrock ranges from about 5 to 10 feet. The depth to fragipan ranges from about 20 to 28 inches. The fragipan ranges from about 10 to 36 inches in thickness. The content of chert or gravel in the A and B horizons ranges from about 15 to 40 percent, by volume. The coarse fragments are mostly chert, but some are quartzite, geodes, and sandstone. Some of the coarse chert fragments are the size of pebbles. The chert content of the C horizon ranges from 10 to 60 percent, by volume.

The Tarklin soils are associated with Bodine soils, which are excessively drained, and with the Humphreys, Baxter, and Robinsonville soils, which are well drained. They are not so well drained as the Bodine soils and contain less chert than the Bodine soils. They are not so well drained as the Humphreys, Baxter, and Robinsonville soils. Their Ap horizon is lighter colored than that of the Humphreys soils. Their B horizon is less clayey than that of the Baxter soils.

Tarklin cherty silt loam, 2 to 6 percent slopes (TrB).—A profile of this soil was described as representative for

the series. This soil is gently sloping and occupies stream terraces, foot slopes, and broad ridges. The organic-matter content is low.

Included with this soil in mapping are small areas where the original surface soil is mixed with subsoil. The surface layer of these inclusions is less friable and lighter colored than the surface layer of this soil. Also included are small areas of a soil that has slopes of less than 2 percent but is otherwise similar to this soil.

There is a moderate hazard of erosion when this Tarklin soil is used for cultivated crops. (Capability unit IIe-10; woodland group 6)

Tarklin cherty silt loam, 6 to 12 percent slopes (TrC).—This sloping soil has a profile like the one described for the series. The organic-matter content is low.

Included with this soil in mapping are small areas where the original surface soil is mixed with subsoil. The surface layer of these inclusions is less friable and lighter colored than the surface layer of this soil. Other inclusions are a few small areas where the subsoil is exposed. The surface layer there is yellowish-brown, cherty heavy silt loam, and the fragipan is about 16 to 20 inches below the surface.

There is a severe erosion hazard when this Tarklin soil is cultivated. (Capability unit IIIe-6; woodland group 6)

Weikert Series

The Weikert series consists of shallow, somewhat excessively drained, acid soils on uplands. These soils are strongly sloping to steep. They developed in residuum that is mostly derived from siltstone and shale but is partly derived from sandstone and loess. They occupy narrow, convex ridges and side slopes.

The surface layer is very friable, very dark grayish-brown silt loam, about 2 inches thick, that overlies brown silt loam. The subsoil is yellowish-brown, friable silt loam. Bedrock is about 12 inches below the surface. Flat fragments and fine-grained stones are common to numerous on the surface and in the profile.

The root zone is shallow. Moisture-supplying capacity is low to very low, and natural fertility is low. Permeability is moderately rapid to rapid in the subsoil. Reaction is very strongly acid, except in a very thin layer at the surface. Organic-matter content is very low.

Because they are stony and are strongly sloping to steep, the Weikert soils are difficult to till. Most of the acreage is wooded. A few small areas are used for short-season pasture.

Representative profile of Weikert stony silt loam, 12 to 20 percent slopes:

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) stony silt loam; weak, fine, granular structure; very friable; many fine roots; neutral; clear, wavy boundary; 0 to 3 inches thick.

A2—2 to 7 inches, brown (10YR 5/3) silt loam; weak, fine and medium, subangular blocky structure; very friable; many small roots; content of coarse fragments is about 15 percent, by volume; very strongly acid; clear, wavy boundary; 4 to 6 inches thick.

B—7 to 12 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; few small roots; content of coarse fragments is about 60 percent, by volume; very strongly acid; gradual, wavy boundary; 3 to 12 inches thick.

R—12 inches +, siltstone and shale bedrock.

In some places the A1 horizon ranges to dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1). The A2 horizon is pale brown (10YR 6/3) in some places. The B horizon is dominantly yellowish brown (10YR 5/6 to 5/4).

The depth to bedrock ranges from about 8 to 22 inches. Stones occupy about 5 to 15 percent of the surface area. These stones are mostly 1 to 2 feet in diameter, but a few are 3 to 4 feet in diameter. The texture is dominantly silt loam throughout the profile. In most places the content of coarse fragments throughout the solum ranges from 40 to 70 percent, by volume.

The Weikert soils are associated with the Ramsey soils; with the Wellston soils, which are well drained; and with Rock land. They are shallower and stonier and have a less clayey subsoil than the Wellston soils. They do not have so high a proportion of the surface covered by rock outcrops as does Rock land. They are similar to the Ramsey soils in characteristics that affect use. They are mapped only with the Ramsey soils.

Weikert and Ramsey stony soils, 12 to 20 percent slopes (WrD).—These soils have profiles like those described for the Weikert series and the Ramsey series, respectively. They are strongly sloping and occupy narrow ridges and side slopes. The areas delineated on the soil map contain, for the most part, both Weikert and Ramsey soils. Some delineations contain only the Ramsey soil; some, only the Weikert soil. The two soils are about equal in extent in the mapping unit. The Weikert soil is silt loam. The Ramsey soil is fine sandy loam.

The soils in this mapping unit are not suited to cultivation. They are poorly suited to pasture because they are shallow, stony, and droughty. They are better suited to growing trees and providing food and cover for wildlife. (Capability unit VIIs-1; woodland group 9)

Weikert and Ramsey stony soils, 20 to 50 percent slopes (WrE).—These soils have profiles like those described for the Weikert series and the Ramsey series, respectively. They are moderately steep to steep and occupy side slopes. Not all areas delineated on the soil map contain both the Weikert soil and the Ramsey soil. The Ramsey soil is absent from more of the delineations than is the Weikert soil. The Weikert soil makes up approximately 70 percent of the acreage of this mapping unit. The Weikert soil is silt loam, and the Ramsey soil is fine sandy loam. Included with these soils in mapping were a few areas of sandstone outcrop.

The soils in this mapping unit are suitable only for growing trees and providing food and cover for wildlife. Steepness, stoniness, and shallowness are the main limitations to their use. (Capability unit VIIs-1; woodland group 9)

Wellston Series

The Wellston series consists of deep, well-drained soils of the uplands. These soils developed partly in loess and partly in residual material derived from siltstone, shale, and sandstone. They mostly occupy ridges and are sloping.

The surface layer is brown, friable silt loam. The upper subsoil is yellowish-brown, friable to slightly firm silt loam to light silty clay loam. There is a gradual transition to strong-brown, firm silty clay loam in the lower subsoil.

The root zone is deep. Moisture-supplying capacity is high, and natural fertility is moderately high. Reaction is slightly to strongly acid. Permeability is moderate, and organic-matter content is medium to low.

The Wellston soils are easily tilled throughout a wide range of moisture content without clodding or crusting.

About half of the acreage is used for crops and pasture. The rest is in second-growth hardwoods. The Wellston soils are suited to all the crops commonly grown in the county.

Representative profile of Wellston silt loam, 6 to 12 percent slopes:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; slightly acid; many roots; clear, smooth boundary; 6 to 9 inches thick.

B1—8 to 14 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, granular structure; friable; common roots; strongly acid; clear, smooth boundary; 3 to 7 inches thick.

B21t—14 to 19 inches, yellowish-brown (10YR 5/6 to 5/8) light silty clay loam; moderate, medium, subangular blocky structure; slightly firm, slightly sticky, slightly plastic; few clay films; strongly acid; clear, wavy boundary; 4 to 8 inches thick.

B22t—19 to 38 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly sticky, slightly plastic; common clay films; few to common sandstone and siltstone fragments less than 5 inches long; strongly acid; gradual, wavy boundary; 12 to 24 inches thick.

R—38 inches +, interbedded siltstone, sandstone, and shale bedrock.

The hue of the A and B horizons ranges mostly from 10YR to 7.5YR; it is rarely 5YR. The Ap horizon has color values of 3 through 6 and chromas of 2 or 3. The B1 horizon has color values of 4 to 5 and chromas of 3 or 4. The B21t and B22t horizons have color values of 4 or 5 and chromas of 4 to 8. The texture of the B21t and B22t horizons ranges from heavy silt loam to silty clay loam.

The solum ranges from about 2 to 4 feet in thickness. The part of the solum that developed in loess is most commonly about 1 to 2 feet thick. The depth to bedrock is 36 to 50 inches.

The Wellston soils are associated with the Zanesville soils, which are moderately well drained, and with the Weikert and Ramsey soils, which are shallow and stony. They are better drained than the Zanesville soils and lack the fragipan layer of the Zanesville soils. They are deeper and less stony and contain fewer coarse fragments than the Weikert and Ramsey soils. They are less sandy than the Ramsey soils.

Wellston silt loam, 6 to 12 percent slopes (WsC).—A profile of this soil was described as representative for the series. This soil is sloping and occupies ridgetops.

Mapped with this soil are small areas that have slopes of less than 6 percent and a few areas that have slopes of up to 20 percent. Also included in mapping are small areas where the original surface soil has been mixed with subsoil, and the surface layer is lighter colored and slightly less friable than the surface layer of this soil. Also included are a few, very small areas where the subsoil is exposed. Included also are a few areas of soils that have a red to dark-red, clayey subsoil.

There is a severe erosion hazard when this Wellston soil is used for cultivated crops. (Capability unit IIIe–1; woodland group 2)

Zanesville Series

The Zanesville series consists of moderately well drained, acid soils on broad ridgetops of the uplands. These soils are gently sloping. They developed partly in loess that was deposited on soil material derived from sandstone, siltstone, and shale.

The surface layer is dark-brown to brown, friable silt loam. The upper subsoil is strong-brown, firm light silty clay loam. There is a gradual transition to a yellowish-brown, firm, compact, brittle, mottled layer about 28 inches below the surface.

The root zone is moderately deep. Moisture-supplying capacity and natural fertility are moderate. Reaction is medium to very strongly acid. Organic-matter content is low. Permeability is moderate above the fragipan and slow in the fragipan.

The Zanesville soils are easily tilled throughout a wide range of moisture content without clodding or crusting. Approximately 60 percent of the acreage is used for row crops, hay, and pasture. The rest is wooded with second-growth hardwoods. The Zanesville soils are suited to most crop and pasture plants common to the county. On these soils alfalfa generally dies out by the fourth or fifth year.

Representative profile of Zanesville silt loam, 2 to 6 percent slopes:

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary; 6 to 9 inches thick.

A2—8 to 12 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary; 2 to 5 inches thick.

B2t—12 to 28 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; firm; few thin clay films; strongly acid; clear, wavy boundary; 12 to 18 inches thick.

Bxt—28 to 34 inches, yellowish-brown (10YR 5/4) light silty clay loam; common mottles of light brownish gray (10YR 6/2) and pale yellow (2.5Y 7/4); moderate, medium, subangular blocky structure; firm, compact, brittle, hard; few thick clay films; few, small, black concretions; strongly acid; gradual, smooth boundary; 4 to 10 inches thick.

IICx—34 to 46 inches, mottled, light yellowish-brown (10YR 6/4), light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and gray (10YR 6/1) sandy clay loam; weak, medium, subangular blocky structure to massive; firm, very compact, very brittle; few tongue-like clay flows; few, small, black concretions and common, small fragments of sandstone and siltstone; very strongly acid; clear, wavy boundary; 10 to 20 inches thick.

R—46 inches +, interbedded sandstone, siltstone, and shale bedrock.

Horizons in the solum have ranges of one or two units in value and chroma. The ranges are narrower in the A and upper B horizons than in the deeper ones. The hue of the B horizons ranges dominantly from 7.5YR to 10YR. The texture of the B horizons ranges from heavy silt loam to silty clay loam. The C horizon is sandy clay loam, clay loam, or loam.

The loess mantle is most commonly about 30 inches thick. The depth to the fragipan ranges from about 24 to 30 inches. The depth to bedrock ranges from about 4 to 6 feet.

The Zanesville soils are associated with the Wellston soils, which are well drained, and with the Sango soils, which are moderately well drained. The Zanesville soils are not so well drained as the Wellston soils. They have a fragipan, and the Wellston soils do not. They are darker colored and of redder hue throughout and slightly better drained than the Sango soils.

Zanesville silt loam, 2 to 6 percent slopes (ZaB).—A profile of this soil was described as representative for the series. This soil is gently sloping and occupies broad ridges.

Included with this soil in mapping are small areas where the orginal surface soil is mixed with subsoil. The surface layer of these inclusions is lighter colored and slightly less friable than the surface layer of this soil. Also included are some small areas that have slopes of 6 to 12 percent.

There is a moderate hazard of erosion when this Zanesville soil is used for cultivated crops. (Capability unit IIe–10; woodland group 6)

Use and Management of the Soils for Crops and Pasture [2]

This section is a general guide to the management of the soils of Barren County for crops and pasture. The section has three main parts. The first explains the capability classification system. The second gives general information on managing the soils of Barren County, describes the capability units in the county, and discusses use and management of the soils in each unit. The third part gives estimated yields of the principal crops on each of the soils in Barren County.

This section is based on research and experiments on soils, crops, erosion, drainage, and related factors in farm management that have been carried on by the Agricultural Research Service, the University of Kentucky Agricultural Experiment Station, and the Soil Conservation Service. The section does not suggest specific detailed management for individual soils or crops. More detailed information of this kind can be obtained from the local staff of the Soil Conservation Service, the Agricultural Extension Service, or the Agricultural Experiment Station.

Capability Groups of Soils

Capability classification is the grouping of soils to show their suitability for most kinds of farming. It is a practical classification based on the limitations of the soils, the risk of damage when they are used for ordinary field crops or sown pastures, and the way they respond to treatment. The classification does not apply to most horticultural crops, or to rice and other crops that have special requirements for production. The soils are classified according to degree and kind of permanent limitations, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible major reclamation.

In the capability system, all soils are grouped at three levels, the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groupings, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover. (No class V soils in Barren County)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife food and cover.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production without major reclamation and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (No class VIII soils in Barren County)

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c* is used in those areas where climate is the chief limitation to the production of common cultivated crops but is not used in Barren County.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only subclasses indicated by *w*, *s*, and *c*, because the soils in it are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIe-6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation, and the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs. The Arabic numeral specifically identifies the capability unit within each subclass. In Barren County capability units are generally assigned locally, according to a statewide system. They are not numbered consecutively, because not all of the capability units used in Kentucky are in this county.

Management by Capability Units

The capability units in Barren County are described in this part of the survey. The names of soil series represented are mentioned in the description of each capability unit, but this does not mean that all the soils of a given series appear in the unit. To find the capability classification of any given mapping unit, refer to the "Guide to Mapping Units" at the back of this survey.

For each unit of capability subclasses IIe, IIIe, IVe, and IVs, an example of suitable soil use is given. This example suggests a cropping system suitable for use on a specified length and a specified steepness of slope. The system

[2] Walter J. Guernsey, conservation agronomist, Soil Conservation Service, assisted in preparing this section.

suggested will keep soil losses within tolerable limits. All the examples include contour farming because it is used more widely in Barren County than any other soil conservation practice.

On a slope longer than one covered by an example, but with the same steepness, a cropping system containing more row crops can be used if the land is terraced or contour stripcropped rather than merely contour farmed. On a slope that is longer or steeper, or both longer and steeper, or if less effective conservation methods are practiced, the cropping system suggested in the example needs to be modified. To effectively control erosion under these conditions, it is necessary to use a cropping system involving fewer years of row crops and more years of sod crops. Ordinarily, terraces are not used on slopes steeper than 8 percent.

Differences in crop suitability and management needs stem from great differences among soils in slope, texture, depth to rock, fertility, wetness, and other characteristics. Each farm has its own soil pattern and its own management problems. Some principles of farm management are general enough to apply to all farms. Other soil-management procedures, however, apply only to specific soils and certain crops. The following paragraphs present some principles of farm management that may be applied widely in Barren County. More specific management principles are given in some detail in each of the capability unit discussions.

Fertility needs.—Most Barren County soils are naturally acid, medium to low in organic-matter content, and medium to low in content of the basic plant nutrients. Most of the soils, however, respond well to additions of lime and fertilizer. Any detailed recommendation on liming and fertilizing should be based on laboratory analysis of a soil sample.

Maintenance of organic matter.—The soils of Barren County were never very high in content of organic matter. Furthermore, it is not economical to attempt to build up large amounts of organic matter in them. It is important, however, to maintain a constant supply.

Organic-matter content can be maintained by following good soil conservation practices. These include using farm manure, crop residues, cover and green-manure crops, and sod crops in the cropping system.

Soil tillage.—The two major purposes of tillage are to prepare a seedbed and to control weeds. Planting, cultivating, and harvesting usually tend to destroy the structure of the soil. Therefore, overcultivation of the soil should be avoided. Building up the organic-matter content of the soil and tilling it as little as possible help to maintain the structure of the soil.

Control of soil and water losses.—All soils that are gently sloping or steeper are subject to erosion when used for cultivated crops. Sheet erosion causes the loss of surface soil, which generally contains a larger proportion of organic matter and plant nutrients than does subsoil. Gullies form in areas receiving a concentrated flow of water when proper erosion-control measures are not applied. There are areas of severely eroded and gullied soils in the county that are no longer suitable for crops and pasture.

Where erosion is a hazard, excessive soil and water losses occur, for the most part, during the period when cultivated crops are growing. Accordingly, it is important to use cropping systems that minimize soil and water losses. Such cropping systems should be used in combination with one or more other erosion-control practices. These practices include contour cultivating, terracing, stripcropping, diverting excess water, maintaining grass on waterways, tilling as little as possible, leaving crop residues on the surface, growing cover crops, and applying fertilizer and lime as needed.

Effective combinations of erosion-control measures vary from soil to soil. Different combinations can be equally effective on the same soil. To determine what practice or combination of practices will be effective on a particular soil, it is desirable to consider (1) the effectiveness of each practice in reducing erosion, (2) the erodibility of the soil, (3) the eroding characteristics and distribution of rainstorms during the year, (4) the length of slope, (5) the steepness of slope, and (6) the average annual soil loss that can be tolerated.

The last five factors do not vary appreciably for any one kind of soil, but erosion-control practices can be used singly or in combination, depending on the size of the erosion problem and the desires of the user. In some situations a cropping system of 1 year of a row crop followed by 2 years of meadow keeps the loss of soil within tolerable limits and, if suitable applications of fertilizer are made, can result in adequate yields. If a farmer, however, desires to use the shorter system of 1 year of a row crop alternating with 1 year of meadow, it is necessary to supplement this system with one or more of the erosion-control practices mentioned previously, such as contour cultivation, terracing, or practicing minimum tillage. Assistance in selecting the proper combination of erosion-control practices for a farm or a piece of land can be obtained from the local Soil Conservation Service staff.

Levels of management.—The levels of management needed to get the yields indicated in table 2, page 42, are defined in the following paragraphs.

As the term is used in this survey, a high level of management includes—

1. Using adapted, recommended varieties.
2. Using proper seeding rates, inoculating legume seed, planting at the right time, and using efficient harvesting methods.
3. Controlling weeds, insects, and plant diseases.
4. Following, as a minimum, the current fertilizing recommendations of the University of Kentucky Agricultural Experiment Station or, at least, meeting the fertilizing needs as shown by properly interpreted soil tests.
5. Making adequate applications of lime.
6. Draining naturally wet soils that it is feasible to drain.
7. Using cropping systems that control soil erosion and maintain the structure, tilth, and organic-matter content of the soil.
8. Employing conservation measures, such as contour tillage, terracing, contour stripcropping, and the use of sod waterways.
9. Using cover crops, crop residues, or both, to increase supplies of organic matter and control erosion.
10. Using all applicable pasture management practices.

11. Using such management practices as minimum tillage and interseeding winter crops in row crops.

A high level of management, as the term is used in this survey, is not the highest possible level of management. It is the one that many farmers will find practical to use if they choose to do so, however, and is one that will result in the highest sustained production that is economically feasible.

A medium level of management, as the term is used in this survey, is the minimum fertilization and management that will keep the soil from deteriorating and still produce sufficient crops for some profit.

Failure to adequately apply one or more of the practices listed in the discussion of a high level of management may cause the production level to drop and not return a profit and may result in some permanent damage to the soil. Inadequate drainage and only partial application of erosion-control practices are examples of deficiencies that relate to a medium level of management.

Capability unit I-1

This unit consists of well-drained soils of the Morganfield and Staser series. These soils are level or nearly level and occupy bottoms and depressions. The plow layer and the subsoil are friable silt loam.

These soils have a deep root zone, high moisture-supplying capacity, high natural fertility, and medium organic-matter content. They are neutral to medium acid. Crops on these soils give good response to fertilizer. The soils can be cultivated over a wide range of moisture content without clodding or crusting. Some areas are subject to overflow following heavy rains. Though the soils are not susceptible to erosion, minor areas may be slightly damaged by scouring during very severe floods.

The soils are well suited to all the row crops and hay and pasture plants grown in the area. Tobacco, corn, and small grains grow well year after year on the same area if a high level of management is practiced. All pasture and hay plants grow well on these soils under a medium or higher level of management.

Capability unit I-2

This unit consists of Hamblen silt loam, a moderately well drained soil that occupies first-bottom positions, upland depressions, and areas along intermittent drainageways. The plow layer and the subsoil consist of friable silt loam.

This soil has a deep root zone, very high moisture-supplying capacity, high natural fertility, and medium organic-matter content. It is slightly acid to medium acid. The water table rises to within about 2 feet of the surface during wet seasons, unless artificial drainage is installed. Flooding during wet seasons and flash floods during the growing season occasionally damage crops. Crops give good response to fertilizer. Tilth is easily maintained, and the soil is easy to work. This soil is not susceptible to erosion.

Hamblen silt loam is well suited to all the cultivated crops and hay and pasture plants grown in the county, except alfalfa. Tobacco, corn, and small grains grow well year after year on the same area if a high level of management is practiced. All pasture and hay plants, except alfalfa, grow well on this soil under a medium or higher level of management, and alfalfa grows well under a high level of management. Tile drains are helpful in improving the soil's internal drainage.

Capability unit IIe-1

This unit consists of gently sloping, well-drained soils of the Christian, Crider, Mountview, Nolichucky, and Pembroke series. They are on limestone and sandstone uplands and foot slopes.

These soils have a deep root zone, high to very high moisture-supplying capacity, moderate to high natural fertility, and medium to low organic-matter content. They are slightly acid to very strongly acid. Crops give good response to fertilizer and lime. Tilth is easily maintained, and the soils are easy to work. There is a moderate hazard of erosion when these soils are cultivated.

The soils of this unit are suited to corn, tobacco, and small grains and to hay and pasture plants grown in the county. Some of the pasture and meadow plants that grow well on these soils are Kentucky bluegrass, smooth bromegrass, Kentucky 31 tall fescue, orchardgrass, timothy, alfalfa, red clover, Ladino clover, white clover, and Korean lespedeza.

Various combinations of cropping systems and conservation practices can be used to slow the runoff of surface water and control erosion. For example, on a Crider silt loam having a slope of 4 percent, 100 feet long, corn can be grown year after year if (1) the field is contour farmed, (2) the crop residue is left on the surface over winter, and (3) a high level of management is practiced.

Capability unit IIe-10

This unit consists of gently sloping, moderately well drained to somewhat excessively drained soils of the Dickson, Garmon, Sango, Tarklin, and Zanesville series. These soils occupy uplands and stream terraces. At depths of 20 to 30 inches, the soils have a layer that restricts growth of roots and movement of water. In the Garmon soil the restricting layer is shaly bedrock, but in the other soils it is a fragipan.

These soils have a moderately deep root zone, slow permeability in the fragipan layer, moderate moisture-supplying capacity, medium to low organic-matter content, and moderate to moderately low natural fertility. They are medium acid to very strongly acid. Crops on these soils give fair to good response to fertilizer and lime. The erosion hazard is moderate when these soils are cultivated. The Tarklin soil has a cherty plow layer that is a moderate hindrance to cultivation.

The soils in this capability unit generally are well suited to most of the crops produced in the county. Corn, tobacco, and small grains are well suited under a high level of management. These soils are well suited to Kentucky 31 tall fescue, orchardgrass, timothy, red clover, sericea lespedeza, and Korean lespedeza. They are suitable for Kentucky bluegrass, smooth bromegrass, and Ladino clover. Alfalfa generally is short lived on these soils.

Various combinations of cropping systems and conservation practices are needed on the soils of this unit to slow runoff of surface water and control erosion (fig. 10). For example, a corn-corn-meadow cropping system can be followed on a Dickson silt loam having a slope of 4 percent, 100 feet long, if (1) the field is countour farmed,

Figure 10.—Stripcropping of corn and clover on a Dickson soil in capability unit IIe-10.

(2) minimum tillage is practiced, (3) a cover crop is grown after the first crop of corn, and (4) a high level of management is applied. In this example the first corn crop would be for silage; the second, for grain.

Capability unit IIe-11

This unit consists of gently sloping, well-drained, cherty soils of the Baxter, Christian, Clarksville, Cumberland, and Humphreys series. These soils occupy uplands, stream terraces, alluvial fans, and foot slopes.

These soils have a deep root zone, moderate to high moisture-supplying capacity, moderate to high natural fertility, and medium to low organic-matter content. They are slightly acid to very strongly acid. The chert in the plow layer interferes with cultivation. Crops give good response to fertilizer and lime. The erosion hazard when these soils are cultivated is moderately low.

These soils are suited to most crops common to the county. They are well suited to corn, tobacco, and small grains under a high level of management. They are suited to a number of pasture and meadow plants, including Kentucky bluegrass, smooth bromegrass, Kentucky 31 tall fescue, orchardgrass, timothy, alfalfa, red clover, Ladino clover, white clover, and Korean lespedeza.

Various combinations of cropping systems and conservation practices are needed to slow the runoff of surface water and control erosion. For example, on a Cumberland cherty silt loam having a slope of 4 percent, 100 feet long, a corn-corn-meadow cropping system can be used if (1) the field is contour farmed, (2) a cover crop is seeded after the first corn crop, and (3) a high level of management is practiced. In this example both corn crops would be used for silage.

Capability unit IIw-1

This unit consists of nearly level, moderately well drained soils of the Dickson and Sango series. These soils occupy uplands and stream terraces. At a depth of 20 to 30 inches, a fragipan limits the root zone.

These soils have slow permeability in the fragipan, moderate moisture-supplying capacity, medium to low organic-matter content, and moderate to moderately low natural fertility. They are strongly acid to very strongly acid. The water table is within 18 to 24 inches of the surface during winter and early in spring. Crops give fair to good response to fertilizer and lime.

These soils are suited to most of the crop and pasture plants grown in the county. Tobacco, corn, and small grains grow moderately well year after year on the same area when a high level of management is practiced. These soils are well suited to plants that tolerate slight wetness, including Kentucky 31 tall fescue, redtop, red clover, alsike clover, Korean lespedeza, Kobe lespedeza, and Ladino clover. These plants produce good yields when a medium level of management is practiced. Alfalfa and orchardgrass usually die out in 1 to 2 years on these soils.

Capability unit IIw-4

This unit consists of Newark silt loam, a somewhat poorly drained, level soil on the flood plains and in depressions in the uplands. This soil has a deep root zone, very high moisture-supplying capacity, moderately high natural fertility, and low organic-matter content. It is about neutral in reaction. It is subject to a high water table within the root zone during wet seasons. Crops give good response to fertilizer.

When adequately drained, this soil is suited to most of the row crops and hay and pasture plants grown in the area. Tobacco, corn, and small grains grow well year after year on the same area if a high level of management is used, but there is a hazard of damage by flooding. This soil is well suited to plants that withstand slight wetness, including Kentucky 31 tall fescue, redtop, red clover, alsike clover, Ladino clover, Korean lespedeza, Kobe lespedeza, and reed canarygrass. Alfalfa and orchardgrass tend to die out in 2 or 3 years.

Capability unit IIs-1

This unit consists of Robinsonville gravelly silt loam, a well-drained, first-bottom soil. The plow layer is gravelly silt loam. Gravel occurs throughout the profile and makes up 15 to 40 percent of the soil, by volume. The pebbles are as much as 3 inches in diameter.

This soil has a deep root zone, moderate moisture-supplying capacity, moderately high natural fertility, and medium to low organic-matter content. It is slightly acid. Its high gravel content makes the soil somewhat difficult to till and reduces its moisture-supplying capacity. Flooding during the growing season may damage crops. There is no erosion hazard.

This soil is capable of growing all the kinds of row crops and pasture and hay plants common in the county. Tobacco, corn, and small grains grow well year after year on the same area when a high level of management is used.

Capability unit IIIe-1

This unit consists of sloping, well drained and moderately well drained soils of the Christian, Crider, Dickson, Mountview, Nolichucky, Pembroke, and Wellston series. These soils are on limestone and sandstone uplands and foot slopes. The Dickson soil in this capability unit has a slowly permeable fragipan layer, 24 to 30 inches below the surface, that restricts root growth and restricts drainage moderately.

These soils have a deep root zone, high moisture-supplying capacity, moderate to high natural fertility, and low organic-matter content. They are slightly acid to very strongly acid. Crops give good response to fertilizer and lime. Tilth is easily maintained, and the soils are easy to work. The erosion hazard is severe when these soils are cultivated.

The soils of this capability unit are suited to all row crops and hay and pasture plants grown in the county. Corn, tobacco, and small grains grow well if a high level of management is practiced. Some of the pasture and meadow plants suitable for growing on these soils are Kentucky bluegrass, smooth bromegrass, Kentucky 31 tall fescue, orchardgrass, timothy, alfalfa, red clover, Ladino clover, white clover, and Korean lespedeza. Alfalfa, orchardgrass, and smooth bromegrass tend to be short lived on the Dickson soil, however.

Various combinations of cropping systems and conservation practices can be used to slow the runoff of surface water and control erosion. For example, on a Crider silt loam having a slope of 8 percent, 100 feet long, a corn-corn-meadow-meadow cropping system can be used if (1) the field is contour farmed, (2) the first corn crop is followed by a cover crop, (3) the residue from the second corn crop is left on the land, and (4) a high level of management is used. In this example the first crop of corn would be for silage; the second would be for grain.

Capability unit IIIe-6

This unit consists of sloping, generally well-drained, cherty soils of the Baxter, Christian, Clarksville, Cumberland, Humphreys, and Tarklin series. These soils are on limestone and sandstone uplands, stream terraces, alluvial fans, and foot slopes. Chert fragments or pebbles of stream gravel, from 1 to 5 inches across, make up about 15 to 50 percent, by volume, of the profile of these soils.

The root zone is deep, except in the Tarklin soil where it is moderately deep to a slowly permeable fragipan layer. The Tarklin soil is moderately well drained. The soils in this unit have moderate to high moisture-supplying capacity, moderate to high natural fertility, and low organic-matter content. They are slightly acid to very strongly acid. Crops give good response to fertilizer and lime. The erosion hazard is severe when these soils are cultivated. The other main limitation to growing row crops on these soils is chertiness.

These soils are suited to most of the row crops and hay and pasture plants grown in the county (fig. 11). Tobacco, corn, and small grains grow moderately well if a high level of management is practiced. Some of the suitable pasture and meadow plants are Kentucky bluegrass, orchardgrass, timothy, Ladino clover, red clover, Kentucky 31 tall fescue, sericea lespedeza, Kobe lespedeza, and Korean lespedeza. Alfalfa has only limited suitability on the Tarklin soil because of the restricted depth of the root zone.

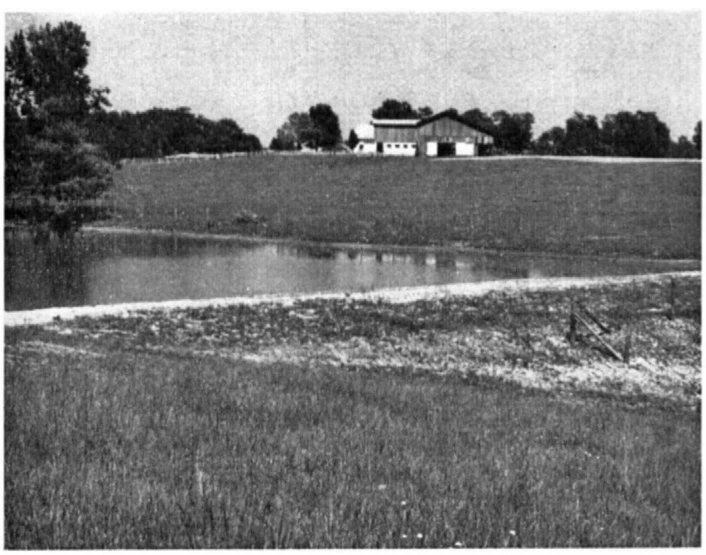

Figure 11.—**This pasture shows good land use and management of a Baxter soil in capability unit IIIe-6.**

Various combinations of cropping systems and conservation practices can be used to slow the runoff of surface water and to control erosion. For example, on a Baxter cherty silt loam having a slope of 8 percent, 100 feet long, a corn-corn-meadow cropping system can be used if (1) the field is contour farmed, (2) minimum tillage is practiced, and (3) a high level of management is followed. In this example both corn crops would be grown for grain and the crop residues would be left on the surface over winter.

Capability unit IIIe-14

This unit consists of well-drained, gently sloping soils of the Needmore and Talbott series. These soils are on uplands. They have a clayey subsoil and are underlain by calcareous shales and limestones. Chert fragments, 1 to 3 inches across, make up about 15 to 30 percent of the profile volume of the Talbott cherty soil in this unit.

The soils in this unit have moderate moisture-supplying capacity, moderately slow permeability, and low organic-matter content. They are medium acid to strongly acid. Tillage of the Talbott soils is somewhat difficult because of a moderately clayey plow layer, and because of chertiness in some areas. Effective root growth is restricted in the Needmore soil by a tight clay layer about 13 inches below the surface. Crop response to fertilizer is fair. The acidity can easily be corrected by liming. The erosion hazard is severe when these soils are cultivated and is the main limitation to their use.

These soils are suited to most of the row crops and hay and pasture plants grown in the county. Most crops, including tobacco, corn, and small grains, grow moderately well if a high level of management is practiced. Some of the suitable pasture and hay plants are orchardgrass, Kentucky bluegrass, Kentucky 31 tall fescue, timothy, alfalfa, Ladino clover, red clover, Kobe lespedeza, Korean lespedeza, and sericea lespedeza.

Various combinations of cropping systems and conservation practices can be used to slow runoff of surface water and control erosion. For example, on a Talbott silty clay loam having a slope of 5 percent, 100 feet long, a corn-corn-meadow cropping system can be used if (1) the field is contour farmed, and (2) a high level of management is practiced.

Capability unit IIIw-1

This unit consists of Taft silt loam, a somewhat poorly drained, level soil on upland flats and stream terraces. A slowly permeable fragipan, about 12 to 19 inches below the surface, restricts root growth, drainage, and the moisture-supplying capacity of this soil. The soil has low organic-matter content and moderately low natural fertility. It is strongly acid to very strongly acid. Its wetness is difficult to correct by artificial drainage because the fragipan is so near the surface. In this unit plants that are tolerant of wet soil give good response to lime and fertilizer. Planting of cultivated crops grown in the area

is commonly delayed on this soil because it dries out slowly in spring.

Taft silt loam is poorly suited to most row crops and hay and pasture plants grown in the area, unless it is drained. After it is drained, it is moderately well suited to corn under a high level of management. Even after it is drained, it is poorly suited to tobacco and small grains. Corn can be grown on this soil year after year when a high level of management is followed. Plants that withstand slight to moderate wetness, such as Kentucky 31 tall fescue, redtop, red clover, alsike clover, Ladino clover, Korean and Kobe lespedeza, and reed canarygrass, are well suited to this soil.

Capability unit IIIw-5

This unit consists of poorly drained soils of the Melvin and Roellen series. These soils occupy first bottoms on flood plains and large upland depressions. They are slightly acid.

The main limitations of these soils are a water table at or near the surface during winter and spring and risk of crop damage caused by overflowing streams. It is feasible to drain these soils partially, but suitable sites for drain outlets are not available in many places, and a suitable system is costly. The Roellen soil in this unit is finer textured and more difficult to till than the Melvin soil. The acreage of the Roellen soil is very small. There is no hazard of erosion in using these soils.

The soils in this unit, unless drained, are poorly suited to most row crops and hay and pasture plants grown in the county. Under a high level of management, corn is moderately well suited. Tobacco and small grain grow poorly, even under a high level of management. If a high level of management is used, these soils can be cultivated year after year without damage to the soil tilth and structure. Grasses and legumes, such as timothy, Korean and Kobe lespedeza, Kentucky 31 tall fescue, redtop, reed canarygrass, alsike clover, and Ladino clover are well suited to these soils. The Roellen soil has the potential of producing higher yields than the Melvin soil.

Capability unit IVe-3

This unit consists of deep, well-drained, strongly sloping soils of the Baxter, Christian, Clarksville, and Cumberland series. These soils are on uplands. They are moderately eroded and have a few galled spots where the subsoil is exposed. Chert fragments, 1 to 5 inches across, make up about 15 to 40 percent, by volume, of the profile of these soils. The content of organic matter is low. Excessive runoff, steepness, and risk of soil damage by erosion constitute very severe limitations to growing cultivated crops on these soils. Less limiting features are their acidity, chertiness, and low organic-matter content. Crops give good response to lime and fertilizer.

The soils of this unit are suited to most of the row crops and hay and pasture plants grown in the county. Tobacco, corn, and small grains grow moderately well under a high level of management. Kentucky bluegrass, smooth bromegrass, alfalfa, Ladino clover, Kentucky 31 tall fescue, orchardgrass, red clover, and sericea lespedeza are suited to these soils.

Various combinations of cropping systems and conservation practices can be used to slow runoff of surface water and control erosion. For example, on a Baxter cherty silt loam having a slope of 12 percent, 75 feet long, a corn-meadow-meadow cropping system can be used if (1) the field is contour farmed, (2) the corn residue is left on the soil, and (3) a high level of management is followed.

Capability unit IVe-8

This unit consists of well-drained, moderately eroded, sloping soils of the Needmore and Talbott series. These soils occur on uplands. Chert fragments, 1 to 5 inches across, make up 15 to 30 percent, by volume, of the profile of the Talbott cherty silty clay loam. The silty clay loam surface layer of that soil in most places is a mixture of the original surface soil and subsoil. In a few galled spots the clayey subsoil is exposed. These soils have moderately slow permeability, and their content of organic matter is low.

Among the principal limitations to using the soils in this unit for cultivated crops are excessive runoff, moderately slow permeability, and the risk of soil damage by erosion. Another main limitation is the difficulty of maintaining good tilth because of the moderately fine textured plow layer and low organic-matter content. These soils are subject to severe clodding and crusting. Crops give only fair response to fertilizer and lime. The erosion hazard is very severe when these soils are cultivated.

These soils are suited to the row crops and hay and pasture plants normally grown in the county. Tobacco, corn, and small grains grow fairly to moderately well if a high level of management is practiced. Kentucky bluegrass, orchardgrass, timothy, alfalfa, white dutch clover, red clover, Kentucky 31 tall fescue, sericea lespedeza, and Korean lespedeza are suitable grasses and legumes.

Various combinations of cropping systems and conservation practices can be used to slow runoff of surface water and control erosion. For example, on a Talbott cherty silty clay loam having a slope of 8 percent, 75 feet long, a corn-corn-meadow-meadow-meadow cropping system can be used if (1) the field is contour farmed, and (2) a high level of management is practiced.

Capability unit IVe-11

This unit consists of well-drained, severely eroded, sloping soils of the Christian, Cumberland, and Pembroke series. These soils are on uplands. The texture of the surface soil ranges from sandy clay loam to silty clay. With the exception of the Christian silty clay loam and the Pembroke soil, the soils of this unit are cherty. Numerous shallow gullies occur in some areas. The organic-matter content of the soils in this capability unit is very low. The rate of water intake is slow. The tillage qualities are poor. When these soils are cultivated, there is a very severe hazard of excessive runoff and additional soil damage by erosion, and yields are generally low.

These soils are suited to most of the row crops and hay and pasture plants grown in the county. Tobacco, corn, and small grains grow poorly, even under a high level of management. Kentucky bluegrass, orchardgrass, timothy, red clover, alfalfa, Kentucky 31 tall fescue, sericea lespedeza, and Korean lespedeza are suitable grasses and legumes.

Various combinations of cropping systems and conservation practices can be used to slow runoff of surface water and control erosion. For example, on a slope of 8 percent, 75 feet long, a corn-corn-meadow-meadow-mea-

dow cropping system can be used if (1) the field is contour farmed, and (2) a high level of management is followed.

Capability unit IVw-1

This unit consists of Dowellton silt loam, a poorly drained, level soil on upland flats. A tight clay layer, at a depth of 12 to 20 inches, restricts root growth and water movement. This soil is saturated with water during winter and most of the spring and may be ponded for short periods.

This soil has a shallow root zone, moderately low natural fertility, moderate moisture-supplying capacity, and low organic-matter content. It is medium acid in the upper horizons and neutral in the lower part. The soil is very difficult to drain because of slow water movement through the subsoil and lack of suitable outlets for artificial drainage. Shallowness of the root zone causes the soil to be too dry for plant growth during dry periods. There is no erosion hazard.

Unless it is drained, Dowellton silt loam is poorly suited to most of the row crops and hay and pasture plants grown in the county. Growth of cultivated crops is generally poor. Suitability for corn is poor to fair, even under a high level of management. This soil is not suitable for tobacco and small grain. Pasture plants that are tolerant of wet soil for long periods give moderate yields on this soil. Pasture and meadow plants suitable for growing on this soil include Kentucky 31 tall fescue, reed canarygrass, redtop, alsike clover, Ladino clover, and Korean and Kobe lespedeza.

Under a high level of management, this soil can be cultivated if a cropping system is used that consists of 2 years of corn followed by 2 years of sod to help maintain soil tilth and structure.

Capability unit IVs-2

This unit consists of sloping soils of the Bodine and Garmon series. These soils occupy ridgetops. The Bodine soil in this unit is cherty and is excessively drained. The Garmon soil has a lower content of coarse fragments and is not so excessively drained; it is of very minor extent.

These soils are droughty, and their content of organic matter is low. They contain large amounts of coarse chert and shale fragments. Their depth and natural fertility are somewhat unfavorable for root growth. The Bodine soil is strongly acid.

The soils in this unit are poorly suited to corn, wheat, and tobacco, even under a high level of management. Some of the suitable pasture and hay plants are Kentucky 31 tall fescue, sericea lespedeza, red clover, Korean lespedeza, and redtop. Because these soils are droughty, spring is generally the best time to seed pasture and hay plants.

Various combinations of cropping systems can be used to slow runoff of surface water and control erosion. For example, on a Bodine cherty silt loam having a slope of 8 percent, 75 feet long, a corn-meadow-meadow-meadow cropping system can be used if (1) the field is contour farmed, (2) the corn residue is left on the land, and (3) a high level of management is practiced.

Capability unit VIe-1

This unit consists of moderately eroded, well-drained, strongly sloping to moderately steep soils of the Baxter, Clarksville, and Talbott series. These soils are cherty, and chert fragments, 1 to 5 inches across, make up 15 to 40 percent, by volume, of the profile. The content of organic matter is low. The Talbott soil in this capability unit has moderately slow permeability and water intake.

The soils are not suited to cultivated crops, because of the risk of damage by erosion. They are, however, well suited to pasture and hay crops. Kentucky bluegrass, orchardgrass, timothy, red clover, and alfalfa are fairly well suited to soils in this unit. Kentucky 31 tall fescue and sericea lespedeza are well suited to these soils.

Because of their steepness and the hazard of erosion, it is important to maintain vegetative cover on these soils. Pasture mixtures should be selected to yield satisfactory forage production, provide ground cover, and require the least frequent renovation of the pasture. Pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow plants to renew their growth. Grazing should be so managed as to keep the plants at least 3 inches high.

Capability unit VIe-2

This unit consists of sloping and strongly sloping, well-drained, severely eroded soils of the Baxter, Christian, Cumberland, Needmore, and Talbott series. These soils have a clayey or moderately clayey plow layer and clayey subsoil. They occur on ridgetops and side slopes. All the soils of this unit are cherty, except the Needmore soil. Chert fragments make up 15 to 40 percent of the volume of the cherty soils. The organic-matter content of the soils in this unit is very low. Their intake of water is slow. Consequently, they are subject to excessive runoff. For the most part, they are strongly acid. Crops grown on these soils give a fair response to lime and fertilizer.

The soils in this unit are not suited to row crops, because of the erosion hazard. They are, however, well suited to pasture and hay. Kentucky bluegrass, orchardgrass, timothy, and red clover are moderately suitable for these soils. Kentucky 31 tall fescue and sericea lespedeza are even more suitable and produce moderate yields of forage when the level of management is medium or high.

Because of the erosion hazard, management to maintain vegetative ground cover is important. Pasture mixtures should be selected to yield a satisfactory amount of forage, provide ground cover, and require the least frequent renovation of the pasture. Pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow plants to renew their growth. Grazing should be so managed as to keep the plants at least 3 inches high.

Capability unit VIs-1

This unit consists of well-drained, sloping to strongly sloping, very rocky soils of the Baxter, Caneyville, and Fredonia series. Exposed rock and boulders cover 10 to 25 percent of the surface. The sloping Fredonia very rocky silty clay in this unit is severely eroded; it has a fine-textured plow layer. All the soils in this unit have a moderately deep root zone, low to very low content of organic matter, and moderately slow permeability. They are strongly acid. Crops give good response to fertilizer and lime. All these soils are subject to damage by erosion if not kept in protective cover.

The soils in this unit are too rocky and erodible to be used for row crops. Loose rocks and rock outcrops inter-

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fere with tillage and make it difficult to prepare seedbeds for hay crops. These soils are fairly well suited to pasture. Kentucky bluegrass, orchardgrass, timothy, red clover, sweetclover, and Korean lespedeza can be grown, but the stands are not vigorous, are short lived, and need to be renovated frequently. Kentucky 31 tall fescue and sericea lespedeza produce better yields and provide better vegetative cover for the soil.

Because of their rockiness and the erosion hazard, it is important to maintain vegetative cover on these soils. Pasture mixtures should be selected to yield satisfactory forage production, provide ground cover, and require the least frequent renovation of the pasture. Pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow plants to renew their growth. Grazing should be so managed as to keep the plants at least 3 inches high.

Capability unit VIs–3

This unit consists of strongly sloping, excessively and somewhat excessively drained soils of the Bodine and Garmon series. Chert fragments, 1 to 10 inches across, make up 20 to 90 percent of the profile volume of the Bodine soil in this unit. The Garmon soil is shaly.

The root zone of these soils is moderately deep. They have low moisture-supplying capacity, low to moderate natural fertility, and low organic-matter content. They are medium acid to very strongly acid. Chertiness makes the Bodine soil difficult to till. Plants give fair response to fertilizer and lime on the soils in this unit, but yields are generally low.

These soils are too cherty, shaly, and erodible to be used for row crops. The chert and shale interfere with tillage and make it difficult to prepare seedbeds for hay crops. These soils are best used for pasture or woodland. Orchardgrass, red clover, and Korean lespedeza can be grown, but the stands are not vigorous, are short lived, and need to be renovated frequently. Kentucky 31 tall fescue and sericea lespedeza produce better yields and provide better vegetative cover for the soil.

Because of the chert and shale and the erosion hazard, maintaining vegetative cover is most important. Pasture mixtures should be selected that will yield satisfactory forage production, provide ground cover, and require the least frequent renovation of the pastures. Pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow the plants to renew their growth. Grazing should be so managed as to keep the plants at least 3 inches high.

Capability unit VIIe–2

This unit consists of Garmon silt loam, 20 to 35 percent slopes, a somewhat excessively drained, moderately steep to steep soil. Below the surface layer, thin shale fragments, ¼ to 1 inch or more in length, make up 20 to 45 percent of the soil volume. This soil has low moisture-supplying capacity, moderately low natural fertility, and low organic-matter content.

This soil is not suitable for cultivation. It is steep, and there is risk of damage by erosion. The soil has limited suitability for pasture but is better for woods or wildlife. The selection of suitable pasture plants is limited. Kentucky 31 tall fescue and sericea lespedeza produce low to moderate yields under a medium level of management. Other pasture plants give very low yields, are not vigorous, and are short lived. The use of a high level of management usually is not justified on this soil.

Because of the steep slopes and the erosion hazard, maintaining vegetative cover is important. Pasture mixtures should be selected to produce satisfactory yields of forage, to provide ground cover, and to permit the least frequent renovation of the pasture. It is extremely difficult to operate farm machinery over the steep pastures. Consequently, mowing to control weeds and spreading fertilizer and lime are difficult, costly, and, in places, hazardous.

Pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow the plants to renew their growth. Grazing should be so managed as to keep the vegetation at least 3 inches high.

Capability unit VIIe–4

This unit consists of Gullied land and is characterized by an intricate pattern of moderately deep to deep gullies. Included in the unit are a few areas that are relatively free of gullies but that show the effects of severe sheet erosion. In places some narrow strips between the gullies are only moderately eroded. In most places, however, the lower subsoil or parent material is exposed. This unit is strongly sloping to moderately steep in most places.

Many of the areas in this unit were once productively used for row crops, hay, and pasture, but very severe sheet and gully erosion have made them unsuitable for these uses. They are now either idle or gradually reverting to woods. Some areas are growing up in redcedar; others are in brush. Areas in this unit can seldom be reclaimed economically for pasture. Usually, they are most suitable for growing trees or providing food and cover for wildlife.

Capability unit VIIs–1

This unit consists of strongly sloping to steep, excessively drained to somewhat excessively drained soils of the Bodine, Ramsey, and Weikert series. These soils occupy side slopes. Chert or sandstone fragments, 1 to 8 inches in size, make up 20 to 90 percent of the subsoil volume. Stones, 1 foot and larger in size, occupy 6 to 20 percent of the surface of the Weikert and Ramsey soils, which were mapped together in two mapping units, both of which are entirely in this capability unit. In a few small areas, stones cover as much as 75 percent of the surface.

The soils in this unit have a shallow root zone, low to very low moisture-supplying capacity, low natural fertility, rapid permeability, and low to very low organic-matter content. They are strongly acid to very strongly acid. The stones and steepness hinder operation of equipment. These soils are subject to excessive runoff and severe erosion if they are not kept in protective cover.

These soils are suited mainly to trees or to use as a source of food and cover for wildlife. Some areas can provide short-season grazing. Kentucky 31 tall fescue and sericea lespedeza are the pasture plants best suited to these soils, but the amount of forage produced is usually low. Other plants are extremely short lived.

The maintenance of ground cover is an important way of controlling erosion of these soils. The pastures should not be grazed continuously. A rest period should be provided after each grazing period to allow the plants to

renew their growth. Grazing should be so managed as to keep the vegetation at least 3 inches high.

Capability unit VIIs–2

This unit consists of moderately eroded and severely eroded soils of the Baxter, Caneyville, and Garmon series. These soils are strongly sloping to moderately steep and occupy uplands. They are mostly well drained and very rocky, except for the Garmon soil. This soil is somewhat excessively drained, shaly, and free of rock outcrops.

The soils in this unit are droughty and have a shallow root zone. Their organic-matter content is very low. The Baxter and Caneyville soils have slow water intake and poor tillage qualities. There is severe risk of additional soil damage by erosion if the soils in this unit are not kept in protective cover.

These soils are suited mainly to growing trees and to providing food and cover for wildlife. Pasture use is limited to short-season grazing. Kentucky 31 tall fescue and sericea lespedeza are the pasture plants most likely to survive on these soils, but it may be difficult to establish them. Because of their rockiness and steepness, it is extremely difficult and hazardous to operate farm machinery on these soils. It is important to maintain ground cover that can control erosion.

Grazing usually should be confined to the normal growing season for the plants used. Once the growth has been eaten, the livestock should be removed to give the plants time to recover enough that they can provide ground cover for winter protection of the soils. Grazing should be so managed as to keep the vegetation at least 3 inches high.

Capability unit VIIs–5

This unit consists of Rock land, on which outcrops of rock, mainly limestone, occupy 25 to 90 percent of the surface. Rock land is on side slopes and ridgetops. It is mostly strongly sloping to moderately steep. The soil between the rock outcrops generally has a silty clay loam surface layer and clay subsoil. It is generally shallow to rock. Many areas are moderately eroded; a few places are severely eroded. The use of Rock land is limited by the numerous rock outcrops, which restrict operation of equipment.

Rock land is mostly in woods. A few areas are cleared and are growing wild grasses and brush, for the most part. This unit is best used for growing trees and providing food and cover for wildlife (fig. 12).

Figure 12.—Capability unit VIIs–5 consists of Rock land. It is mostly wooded and can provide suitable habitat for wildlife.

Estimated Yields

Table 2 gives the estimated average yields under two levels of management for the crops most commonly grown in Barren County. The two levels of management, medium and high, are explained under the heading "Management by Capability Units" on page 33.

The yields given in table 2 are averages for several years. Yields for 1 year may be affected adversely by disasters, or they may be extremely high because of a combination of favorable factors. The yields under a medium level of management are shown in columns A, and those under a high level of management are shown in columns B.

The differences between yields in columns A and those in columns B represent the increases in yields that may be expected by improving management. No yields under a medium level of management are given for tobacco, because a high level of management is nearly always used. The table does not list Gullied land, Made land, and Rock land, because they are generally not suitable for crops and pasture.

Use and Management of the Soils for Wood Crops[3]

Originally, the land in Barren County was largely covered by a hardwood forest. Early settlers progressively cleared and farmed the land. By 1965 approximately 20 percent of the county, or about 62,000 acres, remained in woods, the largest area of woods being in the vicinity of Mammoth Cave National Park.

Privately owned woodland in the county consists principally of small woodlots and areas along fence rows and streambanks. Indiscriminate logging, forest fires, and overgrazing have substantially reduced the proportion of desirable trees. In the existing stands most of the trees are of low or medium quality.

Local markets in Barren County provide an outlet for top-quality oak, yellow-poplar, cherry, and black walnut. Barren County and nearby counties supply raw material to local sawmills, cabinet shops, and shuttle and handle factories. Additional local markets are needed for cedars and hardwoods that are not suitable for lumber or veneer. Some of such cedars and hardwoods can be used for small-dimension stock, for pulpwood, or for charcoal.

Protection of forested areas of the county against fires is adequate.

Many Barren County soils have potential for producing larger wood crops of better quality. To more nearly realize this potential, better management of woodland is generally necessary. Such management should relate to the characteristics of the soils.

[3] By William M. Morrill, woodland conservationist, Soil Conservation Service, in collaboration with E. V. Huffman, assistant State soil scientist, Soil Conservation Service.

TABLE 2.—*Estimated average yields per acre of the principal crops under two levels of management*

[Yields in columns A are those obtained under a medium level of management; yields in columns B are those to be expected under a high level of management. Dashed lines indicate that the crop is not commonly grown on the soil or is poorly suited to it]

Soil	Corn		Tobacco	Wheat		Alfalfa and grass		Red clover and grass [1]		Lespedeza		Pasture	
	A	B		A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lbs.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Baxter cherty silt loam, 2 to 6 percent slopes	65	90	2,400	25	40	2.8	4.0	1.9	2.8	1.0	1.5	150	220
Baxter cherty silt loam, 6 to 12 percent slopes, eroded	60	80	2,200	25	35	2.5	3.9	1.7	2.6	1.0	1.5	145	215
Baxter cherty silt loam, 12 to 20 percent slopes, eroded	50	70	1,450	15	25	2.2	3.5	1.5	2.4	------	------	130	190
Baxter cherty silt loam, 20 to 30 percent slopes, eroded	------	------	------	------	------	2.0	3.2	------	------	------	------	115	180
Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded	------	------	------	------	------	1.2	2.2	.9	1.7	------	------	100	165
Baxter very rocky silt loam, 6 to 20 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	------	80	145
Baxter very rocky silt loam, 20 to 30 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	------	70	(3)
Bodine cherty silt loam, 6 to 12 percent slopes	30	55	1,450	15	20	1.5	2.7	.7	1.8	.5	1.0	80	145
Bodine cherty silt loam, 12 to 20 percent slopes	------	------	------	------	------	1.5	2.6	.6	1.8	------	------	75	140
Bodine cherty silt loam, 20 to 35 percent slopes	------	------	------	------	------	------	------	------	------	------	------	60	(3)
Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	------	70	135
Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	50	(3)
Christian cherty loam, 2 to 6 percent slopes	65	90	2,400	25	40	2.8	4.0	1.9	2.8	1.0	1.5	150	220
Christian cherty loam, 6 to 12 percent slopes, eroded	55	80	2,200	25	35	2.5	3.9	1.7	2.6	1.0	1.5	145	215
Christian cherty loam, 12 to 20 percent slopes, eroded	50	70	1,550	15	25	2.2	3.5	1.5	2.4	------	------	125	190
Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded	35	60	1,350	10	20	1.3	2.5	1.0	2.0	.5	.9	110	175
Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded	------	------	------	------	------	1.2	2.2	.8	1.7	------	------	100	165
Christian silt loam, 2 to 6 percent slopes	75	105	2,600	25	40	3.0	4.3	2.0	2.9	1.0	1.6	155	225
Christian silt loam, 6 to 12 percent slopes, eroded	70	95	2,300	25	35	2.8	4.1	1.9	2.7	1.0	1.6	150	220
Christian silty clay loam, 6 to 12 percent slopes, severely eroded	40	65	1,550	15	25	1.4	2.6	1.1	2.1	.7	1.0	115	180
Clarksville cherty silt loam, 2 to 6 percent slopes	60	85	2,200	20	35	2.4	3.6	1.7	2.6	1.2	1.5	135	200
Clarksville cherty silt loam, 6 to 12 percent slopes, eroded	55	80	2,050	15	30	2.0	3.2	1.5	2.4	1.0	1.5	130	195
Clarksville cherty silt loam, 12 to 20 percent slopes, eroded	45	70	1,350	15	25	2.0	3.0	1.4	2.2	------	------	115	170
Clarksville cherty silt loam, 20 to 30 percent slopes, eroded	------	------	------	------	------	1.5	2.7	------	------	------	------	95	160
Crider silt loam, 2 to 6 percent slopes	90	115	2,800	35	50	3.3	5.0	2.2	3.2	1.5	2.2	170	250
Crider silt loam, 6 to 12 percent slopes, eroded	80	105	2,500	25	40	3.1	4.8	2.0	3.0	1.2	1.8	165	245
Cumberland cherty silt loam, 2 to 6 percent slopes, eroded	75	100	2,800	30	45	2.5	4.8	2.1	3.0	1.2	1.8	165	235
Cumberland cherty silt loam, 6 to 12 percent slopes, eroded	70	90	2,500	25	40	2.4	4.7	2.0	2.8	1.1	1.6	160	230
Cumberland cherty silt loam, 12 to 20 percent slopes, eroded	55	80	1,800	15	25	2.3	4.6	1.7	2.6	------	------	150	215
Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded	45	65	1,700	15	25	1.5	2.9	1.2	2.2	.7	1.1	135	190
Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded	------	------	------	------	------	1.3	2.6	1.1	2.0	------	------	125	180
Dickson silt loam, 0 to 2 percent slopes	60	85	2,200	25	35	------	------	1.5	2.6	1.2	1.7	125	190
Dickson silt loam, 2 to 6 percent slopes	65	90	2,400	25	40	2.0	3.1	1.6	2.7	1.2	1.5	125	190
Dickson silt loam, 6 to 12 percent slopes, eroded	60	80	2,100	20	30	1.8	2.9	1.5	2.6	1.1	1.5	115	180
Dowellton silt loam	35	65	------	------	------	------	------	------	------	1.1	1.5	80	150
Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	------	75	135

See footnotes at end of table.

TABLE 2.—*Estimated average yields per acre of the principal crops under two levels of management*—Continued

Soil	Corn A	Corn B	Tobacco	Wheat A	Wheat B	Alfalfa and grass A	Alfalfa and grass B	Red clover and grass [1] A	Red clover and grass [1] B	Lespedeza A	Lespedeza B	Pasture A	Pasture B
	Bu.	*Bu.*	*Lbs.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded	---	---	---	---	---	---	---	---	---	---	---	45	100
Garmon silt loam, 2 to 6 percent slopes	50	75	1, 950	20	30	2. 0	3. 0	1. 1	2. 2	0. 9	1. 6	105	170
Garmon silt loam, 6 to 12 percent slopes, eroded	35	65	1, 550	10	20	1. 9	2. 8	. 8	2. 0	. 8	1. 5	90	155
Garmon silt loam, 12 to 20 percent slopes	---	---	---	---	---	1. 5	2. 6	. 6	1. 8	---	---	75	140
Garmon silt loam, 20 to 35 percent slopes	---	---	---	---	---	---	---	---	---	---	---	90	(3)
Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded	---	---	---	---	---	---	---	---	---	---	---	60	(3)
Hamblen silt loam	85	120	2, 400	30	45	2. 1	4. 5	2. 0	3. 0	1. 3	2. 0	160	230
Humphreys cherty silt loam, 2 to 6 percent slopes	65	90	2, 400	25	40	2. 8	4. 0	2. 0	2. 9	1. 3	1. 8	150	220
Humphreys cherty silt loam, 6 to 12 percent slopes, eroded	60	80	2, 200	25	35	2. 6	3. 9	1. 8	2. 7	1. 0	1. 7	135	205
Melvin silt loam	---	75	---	---	---	---	---	---	---	. 7	1. 4	105	200
Morganfield silt loam	90	130	2, 800	35	50	3. 5	5. 3	2. 1	3. 0	1. 4	2. 0	185	260
Mountview silt loam, 2 to 6 percent slopes	60	95	2, 400	25	40	2. 3	3. 8	1. 6	2. 7	1. 2	1. 8	150	220
Mountview silt loam, 6 to 12 percent slopes, eroded	55	85	2, 200	20	35	2. 1	3. 6	1. 4	2. 5	1. 0	1. 6	135	205
Needmore silt loam, 2 to 6 percent slopes	40	70	1, 750	15	25	2. 0	3. 0	1. 3	2. 5	. 9	1. 5	115	175
Needmore silty clay loam, 6 to 12 percent slopes, eroded	30	55	1, 450	15	20	1. 6	2. 6	1. 1	2. 0	. 8	1. 3	100	165
Needmore silty clay, 6 to 12 percent slopes, severely eroded	---	---	---	---	---	. 9	2. 0	. 7	1. 5	. 6	. 8	85	150
Newark silt loam	70	100	2, 200	20	30	2. 0	3. 0	1. 5	2. 5	1. 2	2. 0	165	230
Nolichucky fine sandy loam, 2 to 6 percent slopes	80	115	2, 800	35	50	3. 3	5. 0	2. 1	3. 1	1. 4	2. 0	170	250
Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded	75	105	2, 500	25	40	3. 0	4. 8	2. 0	3. 0	1. 2	1. 9	165	245
Pembroke silt loam, 2 to 6 percent slopes	90	115	2, 800	35	50	3. 4	5. 3	2. 5	3. 5	1. 5	2. 2	175	255
Pembroke silt loam, 6 to 12 percent slopes, eroded	85	105	2, 600	30	40	3. 2	5. 1	2. 0	3. 0	1. 2	2. 0	170	250
Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded	42	75	1, 900	15	25	2. 0	3. 5	1. 4	2. 6	1. 0	1. 6	140	195
Robinsonville gravelly silt loam	65	95	2, 100	25	40	2. 6	3. 5	1. 9	2. 7	1. 4	2. 0	115	180
Roellen silty clay loam	55	80	---	---	---	---	---	1. 5	2. 5	1. 3	2. 0	125	190
Sango silt loam, 0 to 2 percent slopes	45	75	1, 800	20	30	---	---	1. 4	2. 5	1. 2	1. 8	105	170
Sango silt loam, 2 to 6 percent slopes	50	80	2, 000	25	35	1. 8	2. 9	1. 6	2. 6	1. 2	1. 8	105	170
Staser silt loam	90	130	2, 800	35	50	3. 5	5. 3	2. 0	3. 0	1. 4	2. 0	185	260
Taft silt loam	45	75	---	---	---	---	---	. 9	1. 9	1. 0	1. 7	125	190
Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded	40	70	1, 850	15	25	2. 0	3. 1	1. 5	2. 2	1. 0	1. 7	120	185
Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded	35	65	1, 600	15	20	1. 6	2. 9	1. 4	2. 0	. 9	1. 5	115	180
Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded	---	---	---	---	---	1. 5	2. 7	1. 0	1. 9	---	---	95	160
Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded	---	---	---	---	---	1. 3	2. 5	. 8	1. 6	. 6	1. 0	75	140
Talbott silty clay loam, 2 to 6 percent slopes, eroded	45	75	1, 950	20	30	2. 2	3. 4	1. 8	2. 5	1. 0	2. 0	125	190
Talbott silty clay loam, 6 to 12 percent slopes, eroded	40	70	1, 750	15	25	2. 0	3. 2	1. 6	2. 2	1. 0	1. 7	120	185
Tarklin cherty silt loam, 2 to 6 percent slopes	60	80	2, 000	25	35	1. 9	3. 0	1. 5	2. 6	1. 0	1. 5	120	180
Tarklin cherty silt loam, 6 to 12 percent slopes	55	75	1, 750	20	30	1. 7	2. 8	1. 4	2. 5	. 7	1. 3	115	170
Weikert and Ramsey stony soils, 12 to 20 percent slopes	---	---	---	---	---	---	---	---	---	---	---	80	(3)
Weikert and Ramsey stony soils, 20 to 50 percent slopes	---	---	---	---	---	---	---	---	---	---	---	60	(3)
Wellston silt loam, 6 to 12 percent slopes	65	95	2, 400	25	35	2. 6	4. 0	2. 0	2. 8	1. 0	1. 5	150	220
Zanesville silt loam, 2 to 6 percent slopes	65	95	2, 300	25	40	2. 0	3. 1	1. 7	2. 7	1. 2	1. 7	130	195

[1] Yields are those to be expected in the second year.
[2] A cow-acre-day is a day of grazing on 1 acre for 1 animal unit (1 cow, steer, or horse; 5 hogs; or 7 sheep) without injury to the pasture. For example, an acre of pasture that provides grazing for 2 cows for 30 days has a capacity of 60 cow-acre-days.
[3] A high level of management ordinarily is not justified.

Woodland Groups

Woodland management can be planned more easily and effectively if soils are grouped according to those characteristics that affect tree growth. To this end the soils in Barren County have been placed in woodland groups. Each group contains soils that can produce similar kinds of wood crops under similar management and that have similar potential productivity. The woodland group for any given mapping unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey. The names of soil series represented are mentioned in describing each group, but the reader should not infer from this that all the soils of a given series are in this group.

The suitability and limitations of Barren County soils for wood crops are discussed in the descriptions of the woodland groups. The suitability is considered in terms of potential soil productivity, tree species to favor in management, tree species to favor in planting, and limitations relating to erosion hazards.

The principal tree species on the sites studied in establishing and describing the Barren County woodland groups were yellow-poplar, upland oak, pin oak, cottonwood, sweetgum, Virginia pine, and eastern redcedar.

In the explanations of the woodland groups, *productivity ratings* are expressed as a range of site indexes. For the following species, the productivity ratings were based on published research, including site index curves: Cottonwood (*5*), sweetgum and pin oak (*4*), upland oak (*13*), Virginia pine (*15*), and yellow-poplar (*3*). For eastern redcedar, the productivity ratings were based on 1948 observations of plots in the Tennessee Valley by the Tennessee Valley Authority. Unpublished site index curves were used in deriving these productivity ratings for eastern redcedar.

The potential productivity of a soil for a specified kind of tree is expressed as a *site index*. The site index is the average height, in feet, that the dominant trees (tallest in the stand) and codominant trees growing on a specified soil will reach at a specified age. In the case of most tree species, this age is 50 years. In the case of cottonwood, it is 30 years. The site index is used by foresters to rate the potential productivity of a soil for one or more wood crops.

Many trees in and near Barren County were measured in gathering data from which to determine the site indexes. As nearly as possible the measurement studies were confined to well-stocked, naturally occurring, even-aged, essentially unmanaged stands that had not been adversely affected by fire, insects, or disease and that had not been damaged by grazing.

The *erosion hazard* is rated according to the risk of erosion on woodland that is well managed in general but is not protected from erosion by special practices. It is assumed that the woodland is protected from fire and overgrazing. Generally, the erosion hazard is *slight* if the slope is 12 percent or less, *moderate* if the slope is 12 to 20 percent, and *severe* if the slope is more than 20 percent. In some cases characteristics of specific soils make it necessary to deviate from these general guidelines. Woodland can be protected from erosion by varying the rotation age and adjusting the cutting cycles; by properly constructing and maintaining roads, trails, and landings; and by using special management techniques.

Topographic features and soil characteristics may restrict the use of conventional wheel or track equipment in planting and harvesting wood crops, in constructing roads, in controlling fires, and in controlling unwanted vegetation. For example, slope, drainage, texture of soil, stoniness, and presence of rocks and ledges help to determine whether heavy equipment can be used. Also, they help to determine how and at what season some kinds of equipment can be used. Generally, the *equipment limitation* is *slight* if (1) the slope is 12 percent or less and (2) farm machinery can be operated efficiently without constructing and maintaining permanent roads and trails for trucks. The rating is *moderate* if (1) the slope is 12 to 30 percent, (2) the use of ordinary farm machinery is restricted, and (3) track equipment is necessary for efficient harvesting. The equipment limitation is also *moderate* if wetness prevents the use of conventional wheel or track equipment during 2 to 6 months of the year. The rating is *severe* if (1) the slope is more than 30 percent, (2) track equipment is not adequate for harvesting trees, and (3) power winches and other special equipment are needed. The equipment limitation is also *severe* if wetness prevents the use of conventional wheel or track equipment during 6 months or more of the year.

Unwanted trees, vines, shrubs, and other plants invade a site when openings are made in the covering canopy of trees. Competition from these invaders hinders the establishment and normal development of desirable seedlings. This is true whether the desirable seedlings start naturally or are planted. *Plant competition* is *slight* if unwanted plants do not hamper desirable species by preventing adequate natural regeneration, by interfering with their early growth, or by restricting the normal development of planted stock. Competition is *moderate* if unwanted plants delay establishment and hinder the growth of either planted stock or naturally regenerated seedlings of desired species. It is also *moderate* if unwanted plants retard the development of a fully stocked stand of desired species. Competition is *severe* if unwanted plants prevent adequate restocking of desired species (either by natural regeneration or by planting) without intensive preparation of the site or special maintenance.

If soil characteristics or topographic features are unfavorable, some loss of tree seedlings is expected, even if there is no competition from unwanted plants. *Seedling mortality* is *slight* if the expected loss is not more than 25 percent of the number of seedlings needed to provide optimum stocking. Seedling mortality is *moderate* if the expected loss is between 25 and 50 percent. It is *severe* if the expected loss is more than 50 percent. If the rating is *moderate* or *severe*, replanting will probably be needed to insure a fully stocked stand of trees. Moreover, special preparation of the seedbed and special planting techniques are often needed when the seedling mortality is *moderate* or *severe*.

Woodland group 1

The soils in this group are deep, well drained, and slightly to moderately eroded. They are gently sloping to moderately steep and are on uplands underlain predominantly by limestone. These soils are in the Baxter, Christian, Clarksville, Crider, Cumberland, Dickson, Humphreys, Mountview, Nolichucky, and Pembroke series. Their potential productivity is high for upland oak,

yellow-poplar, Virginia pine, and eastern redcedar. Intensive woodland management is justified on the soils in this group.

Species to favor in managing existing stands of trees on soils in woodland group 1 are yellow-poplar, black walnut, black cherry, white oak, and northern red oak. Species to favor for planting are black locust, yellow-poplar, black walnut, white pine, shortleaf pine, and northern red oak. Site indexes for the species that were rated are 80 to 90 for upland oak, 90 to 100 for yellow-poplar, 75 to 85 for Virginia pine, and 35 to 45 for eastern redcedar.

The erosion hazard is slight on those soils of this group that have slopes of less than 12 percent. It is moderate on those soils that have slopes ranging from 12 to 20 percent, and severe on those soils that have slopes of more than 20 percent. Roads and skid trails must be carefully located, constructed, and maintained, especially on those soils that have slopes of more than 12 percent.

Equipment limitations are slight on the soils having slopes of less than 12 percent. They are moderate on those having slopes of 12 to 20 percent. The use of track-type equipment is necessary for the efficient harvesting of timber on those soils having slopes of more than 20 percent.

Plant competition is severe, mainly because of the abundance of moisture available to plants during the growing season. Shade-tolerant trees of low quality usually become established in the understory of saw-log stands. After the saw logs are harvested, competition from these low-quality trees interferes with natural regeneration of desirable species. Intensive weeding is usually necessary to control unwanted vegetation. Normally, neither interplanting nor conversion planting is feasible, largely because plant competition is severe. As a rule, trees planted in open fields require at least one cultivation. Seedling mortality is slight in this woodland group.

Woodland group 2

The soils in this group are dominantly shallow to moderately deep, well drained to somewhat excessively drained, and slightly eroded. They are gently sloping to steep soils on uplands and are underlain predominantly by limestone, shale, and sandstone. These soils are in the Garmon and Wellston series. Their potential productivity is fair for upland oak, Virginia pine, and redcedar trees. Only moderately intensive woodland management is justified on these soils.

Species to favor in managing existing stands on soils in this woodland group are black oak, southern red oak, white oak, and hickory. Species to favor for planting are shortleaf pine and loblolly pine. Site indexes are 55 to 65 for upland oak, 70 to 80 for Virginia pine, and 35 to 45 for eastern redcedar.

The erosion hazard is slight on those soils in this group that have slopes of less than 12 percent. It is moderate on those that have slopes of 12 to 20 percent, and severe on those that have slopes of more than 20 percent. Where water concentrates on soils of this group, gullies form readily. Roads and skid trails need to be carefully located, constructed, and maintained, especially on those soils that have slopes of more than 12 percent.

Equipment limitations are slight on those soils that have slopes of less than 12 percent, and moderate on those having slopes of 12 to 30 percent. Track-type equipment is suitable for harvesting of timber on those soils that have slopes of more than 20 percent.

Plant competition is moderate because, during the growing season, there is an adequate supply of moisture in the soil for plant growth. Shade-tolerant trees of low quality tend to become established in the understory of saw-log stands. Competition from these low-quality trees usually prevents the satisfactory reestablishment of desirable species of trees when the overstory trees are harvested. At least one weeding is usually required to insure the dominance of trees that are desirable for wood crops. Because of the possible need for weeding, neither interplanting nor conversion planting is generally feasible. Competition of unwanted plants with newly planted trees ordinarily is moderate to severe on open land that has been abandoned for 2 or more years after use for pasture or harvested crops. Seedling mortality is slight.

Woodland group 3

This group consists of severely eroded, sloping to strongly sloping soils on limestone and shale uplands. These soils are dominantly well drained and range from shallow to deep to bedrock. They are in the Baxter, Caneyville, Christian, Cumberland, Fredonia, Garmon, Needmore, Pembroke, and Talbott series. Their potential productivity is fair for eastern redcedar and low for all other species of trees. Generally, only nonintensive woodland management is justified on these soils.

Species to favor in managing existing stands of trees on soils in woodland group 3 are Virginia pine, black oak, southern red oak, and eastern redcedar. Species to favor in planting are eastern redcedar and Virginia pine. Site indexes are 50 to 60 for upland oak and 30 to 35 for eastern redcedar.

The erosion hazard is slight on slopes of less than 20 percent and moderate on slopes of 20 to 30 percent. Because the steeper soils in this woodland group tend to gully readily, roads and skid trails need to be carefully located, constructed, and maintained.

Mainly because the soils are clayey and rocky, equipment limitations are moderate on slopes of less than 12 percent and severe on slopes of more than 12 percent.

Plant competition is slight in this woodland group. Seedling mortality is moderate because of 2- to 3-week droughts early in some growing seasons. These dry periods cause moderate losses of newly planted trees. Natural seedlings usually become established too slowly on soils in this woodland group to provide adequate stands.

Woodland group 4

The soils in this group are very cherty, predominantly deep, somewhat excessively drained, and uneroded. They are sloping to steep and are on uplands underlain by beds of chert over limestone bedrock. These are Bodine soils. Their potential productivity is fair to moderately high for oak trees and fair for yellow-poplar trees. Moderately intensive woodland management is justifiable on these soils.

Species to favor in managing existing stands of trees on soils in woodland group 4 are black oak, southern red oak, yellow-poplar, and hickory. Species to favor for planting are shortleaf pine, loblolly pine, and white pine. Site indexes are 65 to 75 for upland oak and 75 to 85 for yellow-poplar.

The erosion hazard is slight on slopes of 6 to 20 percent, and moderate on slopes of 20 to 35 percent. The hazard of gully erosion is severe, especially on the steeper slopes. Roads and skid trails must be carefully located, constructed, and maintained.

Equipment limitations are moderate on slopes of 12 to 35 percent. Sometimes it is not possible to use farm machinery on such slopes. Track-type equipment and power winches are needed for harvesting timber on the steeper slopes.

Plant competition is moderate because, during the growing season, there is an adequate supply of moisture in the soil for plant growth. Shade-tolerant trees of low quality usually become established in the understory of saw-log stands on soils in this group. After the trees making up the overstory have been logged off, competition from the shade-tolerant trees interferes with natural regeneration of desirable species. Usually, at least one weeding is necessary to assure survival of desirable seedlings. Generally, neither interplanting nor conversion planting is feasible. Plant competition is severe in open fields that have been idle more than 2 years after use for cultivated crops or pasture.

Because of short droughts early in the growing season, seedling mortality is moderate on these somewhat excessively drained soils. Such droughts last for 2 weeks or more.

Woodland group 5

This group consists of deep, well-drained, nearly level, nonacid soils on flood plains and terraces along streams. These soils are in the Hamblen, Morganfield, Robinsonville, and Staser series. Their potential productivity for desirable trees is high. Intensive woodland management is justified. Upland hardwoods, such as yellow-poplar and upland oak, grow rapidly on those soils in this group that are not subject to being covered by overflow waters frequently or for long.

Species to favor in managing existing stands of trees on soils in woodland group 5 are cottonwood, lowland oak, sweetgum, yellow-poplar, white oak, and black oak. Species to favor for planting are pin oak, sweetgum, cottonwood, and yellow-poplar. Site indexes are 100 to 110 for cottonwood, 90 to 100 for sweetgum, 95 to 105 for lowland oak, 100 to 110 for yellow-poplar, and 80 to 85 for upland oak.

The erosion hazard is slight on soils in this group. Since the seasonal overflow of water is of minor importance on these soils, equipment limitations are slight.

Plant competition is severe because of the abundance of available moisture during the growing season. Shade-tolerant trees of low quality become established in the understory of saw-log stands. Following logging, competition from these shade-tolerant trees usually prevents the reestablishment of desirable trees, unless intensive weeding is done. Neither interplanting nor conversion planting is generally feasible, because of severe competition from unwanted plants. Trees planted in open fields usually need to be cultivated at least once. Seedling mortality is slight on the soils in this group.

Woodland group 6

The soils in this group are moderately deep, moderately well drained, and uneroded. They are level to sloping, are on stream terraces and uplands, and have a fragipan. The soils are in the Dickson, Sango, Tarklin, and Zanesville series. Their potential productivity is moderately high for upland oak, yellow-poplar, and eastern redcedar. Intensive woodland management is justifiable.

Species to favor in managing existing stands of trees on soils in woodland group 6 are white oak, southern red oak, black oak, yellow-poplar, red maple, and black locust. Species to favor for planting are white pine, loblolly pine, shortleaf pine, northern red oak, and black locust. Site indexes are 70 to 80 for upland oak, 80 to 90 for yellow-poplar, and 35 to 45 for eastern redcedar.

The hazard of erosion is slight on the soils in this group, but some attention needs to be given to the proper location, construction, and maintenance of roads and skid trails.

Equipment limitations are slight on these soils.

Plant competition is moderate on the soils in this group because, during the growing season, there is an adequate supply of moisture for plant growth. Shade-tolerant trees of low quality tend to become established in the understory of saw-log stands. When the overstory trees are harvested, competition from these shade-tolerant trees usually prevents the satisfactory reestablishment of desirable species of trees. One or more weedings are usually required to assure the dominance of desirable species. Neither interplanting nor conversion planting is usually feasible, because of competition from unwanted plants. Competition of such plants with newly planted trees usually is moderate to severe in open fields that have been abandoned for 2 or more years after use for harvested crops and pasture. Seedling mortality is slight on the soils in this group.

Woodland group 7

This group consists of level, somewhat poorly drained to very poorly drained soils on bottoms and on terraces along streams. These soils are in the Dowellton, Melvin, Newark, Roellen, and Taft series. Their potential productivity is high for cottonwood, pin oak, and sweetgum. It justifies a high level of woodland management.

Species to favor in managing existing stands of trees on soils in woodland group 7 are cottonwood, pin oak, sweetgum, and yellow-poplar. Species to favor for planting are cottonwood, pin oak, and sweetgum. Site indexes are 95 to 105 for pin oak and 95 to 105 for sweetgum. Where water does not stand for long, the site index for yellow-poplar is 90 to 100.

The hazard of erosion is slight on the soils in this group.

Equipment limitations are moderate to severe because, during 2 to more than 6 months of the year, the water table is less than 15 inches below the surface of the soil.

Plant competition is severe on the soils in this woodland group because abundant moisture is available during the growing season. Shade-tolerant trees of low quality usually become established in the understory of saw-log stands. When the overstory has been removed by logging, competition from these shade-tolerant trees usually prevents the satisfactory reestablishment of desirable species of trees. Intensive weeding is necessary if this competition is to be overcome. Because plant competition is severe, neither interplanting nor conversion planting is ordinarily feasible. Trees generally require one or more cultivations if they are planted in open fields that have been abandoned for 2 or more years after use for harvested

crops or pasture. Seedling mortality is slight on the soils in this group.

Woodland group 8

This group consists of moderately deep, well-drained, moderately eroded, dominantly sloping to strongly sloping soils on uplands. These soils are in the Baxter, Caneyville, Fredonia, Needmore, and Talbott series. They have a clayey subsoil, and some of them are very rocky. Their potential productivity for desirable trees is fair. Only moderately intensive woodland management is warranted.

The site index is 60 to 70 for upland oak.

The hazard of erosion is slight to moderate. On the steeper slopes, roads and skid trails need to be properly located, constructed, and maintained.

Equipment limitations are moderate on slopes of more than 12 percent and on the very rocky soils. To harvest wood crops efficiently, it is often necessary to use track-type equipment and power winches.

Plant competition is moderate on these moderately productive soils. When the overstory trees have been removed by logging, shade-tolerant trees of low quality become established in the understory. The competition from these low-quality trees prevents the satisfactory reestablishment of desirable species. At least one weeding is usually required to assure the dominance of desired kinds of trees. Because of the severity of plant competition, neither interplanting nor conversion planting is usually feasible. Competition of unwanted plants with newly planted trees usually is moderate to severe in open fields that have been abandoned for more than 2 years after use for harvested crops or pasture. Seedling mortality is slight on the soils in this group.

Woodland group 9

This group consists of shallow, somewhat excessively drained, stony, strongly sloping to steep Weikert and Ramsey soils on hillsides (fig. 13). The potential productivity of these soils for trees varies considerably with exposure and elevation. Similarly, there is considerable variation in the intensity of woodland management that is economically warranted.

Figure 13.—**Young stand of thrifty hardwoods, including oak and yellow-poplar, growing on steep Weikert and Ramsey stony soils of woodland group 9.**

Species to favor in managing existing stands of trees on slopes facing north and east are yellow-poplar, white oak, black walnut, basswood, black cherry, and northern red oak. On the lower two-thirds of slopes facing south and west, species to favor are shortleaf pine, Virginia pine, black oak, scarlet oak, and pitch pine.

The potential productivity of these soils is moderately high on slopes facing north and east,[4] the site indexes being 70 to 80 for upland oak, 85 to 95 for yellow-poplar, and 65 to 70 for Virginia pine. On these slopes, intensive woodland management is justified. On the lower two-thirds of the slopes facing south and west,[5] site indexes are 60 to 70 for upland oak and 55 to 65 for Virginia pine. On these slopes only moderately intensive woodland management is justified. Ridgetops and the upper third of slopes facing south have site indexes of 55 to 60 for upland oak and 55 to 65 for Virginia pine. Generally, only management of low intensity is justified in these locations.

On slopes of more than 12 percent, the erosion hazard is moderate. Roads and skid trails need to be carefully located, constructed, and maintained.

Largely because of the stoniness and steepness of the soils in this group, equipment limitations are moderate to severe. Conventional farm equipment cannot be used efficiently on these soils. Consequently, track-type equipment, or power winches are needed to harvest wood crops efficiently.

Plant competition is slight to moderate on slopes facing north and east and slight on slopes facing south and west and on ridgetops. The somewhat excessive drainage of the soils in this group lessens plant competition.

Seedling mortality on soils in this group is moderate on slopes facing north and east and severe on slopes facing south and west and on ridgetops. The moderate rate of mortality is due to the shallowness and somewhat excessive drainage of the soils; they become droughty during the early part of the growing season.

Woodland group 10

This group is made up of Gullied land, Made land, and Rock land, three miscellaneous land types that are so varied that onsite inspection is necessary in making interpretations regarding the growth and management of trees. These miscellaneous land types vary in origin, characteristics, physiography, behavior, and management requirements.

Gullied land consists of areas that are more than 20 percent scarred by moderately deep or deep gullies and of areas where most of the soil profile has been destroyed by extreme sheet erosion. A few patches of surface soil remain between the gullies but in most places erosion has destroyed the original soil. Gullies may develop on any slope but are most likely to develop on sloping to moderately steep land that has been improperly managed. The potential productivity of Gullied land is very low for most species of trees. Shortleaf pine, loblolly pine, and Virginia pine will grow, though slowly, in acid areas and will provide some protection and ground cover. Eastern redcedar

[4] Slopes facing north and east have azimuth bearings from 340° to 124°.

[5] Slopes facing south and west have azimuth bearings from 124° to 340°.

and Virginia pine will grow in areas that are alkaline but not calcareous.

The potential tree productivity of each individual area of Made land should be appraised separately because the soil material varies so much in origin, composition, and compaction. This is true of highway fills and cuts, borrow pits, earth levees, and other areas where construction operations have greatly altered the soil profile.

Rock land consists of areas in which limestone outcrops cover 25 to 90 percent of the surface. In most places the soil material between the outcrops is shallow or very shallow. Consequently, the moisture-supplying capacity is very low. Slopes are generally steep or moderately steep. The potential productivity of Rock land is low or very low for most species of trees. Woodland management is hardly worth while. Rock land supports mixed, generally sparse, stands of redcedar, oak, and hickory trees. Growth of the trees is slow, and their quality is poor or fair at best. Plant competition is variable, but all other critical soil-related hazards and limitations are severe on Rock land.

Use of the Soils for Wildlife Habitats

This section deals with the suitability of the soils of Barren County for growing plants that furnish food and cover for wildlife. It consists of (1) an explanation of the relationship between wildlife management and soils, (2) a table giving numerical ratings of the soils for elements of wildlife habitats and for habitats for classes or kinds of wildlife, (3) definitions of the ratings used in evaluating the suitability of the soils for elements of wildlife habitats, (4) definitions of several elements of wildlife habitats, and (5) definitions of classes of wildlife.

Successful management of wildlife on any tract involves having food, cover, and water available in a suitable combination. Lack of any of these necessities, an unfavorable balance between them, or inadequate distribution of them can seriously limit or make impossible use of the tract as a habitat for desired species of wildlife.

Information on soils is useful in creating, improving, or maintaining environments that are suitable in providing food, cover, and water for wildlife. Most wildlife habitats are managed by planting suitable vegetation, by manipulating existing vegetation, or by a combination of these measures. Knowledge of soils is helpful in carrying out these measures. It is also helpful in creating or improving areas of water as wildlife habitats.

Interpretations of the usefulness of soils for wildlife habitats can be helpful in the selection of suitable sites for management of wildlife habitats. They can indicate the intensity of management needed to achieve satisfactory results and can indicate why it generally may not be feasible to manage an area for a particular kind of wildlife. Information on soils can be useful in broad-scale planning for parks, nature areas, or other recreational developments having wildlife management aspects. It is an important aid in planning for the acquisition of land for the development or protection of wildlife.

Table 3 rates the soils of Barren County according to suitability for the creation, improvement, or maintenance of eight elements of wildlife habitat. The table also rates the soils according to their relative value for habitats for openland wildlife, woodland wildlife, and wetland wildlife; the ratings for these three main classes of wildlife were based on weighted values of selected elements of habitat.

Habitat Suitability Ratings

The following are the four numerical ratings of soils in table 3 and their meanings.

A rating of 1 means well suited to, or above average for, a wildlife habitat element or a habitat for a kind of wildlife. Habitats generally are easily created, improved, or maintained. There are few or no soil limitations to habitat management, and satisfactory results are well assured.

A rating of 2 means suited to, or about average for, a wildlife habitat element or a habitat for a kind of wildlife. Habitats usually can be created, improved, or maintained. There are moderate soil limitations that affect management of habitats. Moderate intensity of management and fairly frequent attention may be required to assure satisfactory results.

A rating of 3 means poorly suited to, or below average for, a wildlife habitat element or a habitat for a kind of wildlife. Habitats usually can be created, improved, or maintained. Soil limitations affecting habitat management are rather severe. Habitat management may be difficult and expensive and may require intensive effort. Results are uncertain.

A rating of 4 means unsuited to a wildlife habitat element or a habitat for a kind of wildlife. Habitats cannot be created, improved, or maintained, or their creation, improvement, or maintenance is impractical under prevailing soil conditions. Unsatisfactory results are probable.

Habitat Elements

The eight habitat elements listed in table 3 are described in the following paragraphs.

Grain and seed crops.—These are seed-producing annuals, including agricultural grains planted to produce food for wildlife. Examples are corn, sorghums, wheat, oats, millet, buckwheat, soybeans, and sunflowers.

Grasses and legumes.—These are domestic perennial grasses and herbaceous legumes that are established by planting and that furnish food and cover for wildlife. Examples are fescue, bromegrass, bluegrass, timothy, redtop, orchardgrass, reed canarygrass, clover, trefoil, alfalfa, and panicgrass.

Wild herbaceous upland plants.—These are native or introduced perennial grasses and forbs (weeds) that provide food and cover principally to upland forms of wildlife and that are established mainly through natural processes. Examples are bluestem, indiangrass, wheatgrass, wild ryegrass, oatgrass, pokeweed, strawberries, lespedeza, beggarweed, wild beans, nightshade, goldenrod, and dandelions.

Hardwood woody plants.—These are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, samaras, twigs (browse), or foliage used extensively as food by wildlife. These are commonly established through natural processes, but many may be planted. Examples are oak, beech, cherry, hawthorn, dogwood, viburnum, maple, birch, poplar, grape, honeysuckle, blueberry, briers, greenbriers, autumn olive, and multiflora rose (fig. 14).

TABLE 3.—*Suitability of soils for elements of wildlife habitats and kinds of wildlife*

[1=well suited or above average; 2=suited or average; 3=poorly suited or below average; 4=unsuited. Absence of figures indicates that the mapping unit is variable in characteristics and that onsite determination is required to determine suitability]

Soil mapping units	Elements of wildlife habitat								Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Excavated ponds	Openland	Woodland	Wetland
Baxter cherty silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Baxter cherty silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Baxter cherty silt loam, 12 to 20 percent slopes, eroded	3	1	1	1	3	4	4	4	1	1	4
Baxter cherty silt loam, 20 to 30 percent slopes, eroded	4	3	1	1	3	4	4	4	3	2	4
Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded	4	3	1	1	3	4	4	4	3	2	4
Baxter very rocky silt loam, 6 to 20 percent slopes, eroded	4	3	1	1	3	4	4	4	3	2	4
Baxter very rocky silt loam, 20 to 30 percent slopes, eroded	4	3	1	1	3	4	4	4	3	2	4
Bodine cherty silt loam, 6 to 12 percent slopes	3	2	2	2	2	4	4	4	2	2	4
Bodine cherty silt loam, 12 to 20 percent slopes	3	2	2	2	2	4	4	4	2	2	4
Bodine cherty silt loam, 20 to 35 percent slopes	4	3	2	2	2	4	4	4	3	2	4
Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded	4	3	2	2	2	4	4	4	3	3	4
Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded	4	3	3	2	2	4	4	4	3	2	4
Christian cherty loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Christian cherty loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Christian silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Christian silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Christian cherty loam, 12 to 20 percent slopes, eroded	3	1	1	1	3	4	4	4	1	1	4
Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded	3	2	1	1	3	4	4	4	2	2	4
Christian silty clay loam, 6 to 12 percent slopes, severely eroded	3	2	1	1	3	4	4	4	2	2	4
Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded	4	2	2	2	2	4	4	4	3	2	4
Clarksville cherty silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Clarksville cherty silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Clarksville cherty silt loam, 12 to 20 percent slopes, eroded	3	2	1	1	3	4	4	4	2	2	4
Clarksville cherty silt loam, 20 to 30 percent slopes, eroded	4	2	1	1	3	4	4	4	2	2	4
Crider silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Crider silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Cumberland cherty silt loam, 2 to 6 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Cumberland cherty silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Cumberland cherty silt loam, 12 to 20 percent slopes, eroded	3	2	1	1	3	4	4	4	2	2	4
Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded	3	2	1	1	3	4	4	4	2	2	4
Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded	4	3	2	1	3	4	4	4	3	2	4
Dickson silt loam, 0 to 2 percent slopes	2	1	1	1	3	3	3	3	1	1	3
Dickson silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Dickson silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Dowellton silt loam	3	2	2	1	2	1	1	1	2	1	1

TABLE 3.—*Suitability of soils for elements of wildlife habitats and kinds of wildlife*—Continued

Soil mapping units	Elements of wildlife habitat								Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Excavated ponds	Openland	Woodland	Wetland
Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded	4	3	2	2	2	4	4	4	3	2	4
Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded	4	3	2	2	2	4	4	4	3	2	4
Garmon silt loam, 2 to 6 percent slopes	3	2	2	2	2	4	4	4	2	2	4
Garmon silt loam, 6 to 12 percent slopes, eroded	3	2	2	2	2	4	4	4	2	2	4
Garmon silt loam, 12 to 20 percent slopes	3	2	2	2	2	4	4	4	2	2	4
Garmon silt loam, 20 to 35 percent slopes	4	3	2	2	2	4	4	4	3	2	4
Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded	4	3	2	2	2	4	4	4	3	2	4
Gullied land	---	---	---	---	---	---	---	---	---	---	---
Hamblen silt loam	2	1	1	1	3	3	3	3	1	1	3
Humphreys cherty silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Humphreys cherty silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Made land	---	---	---	---	---	---	---	---	---	---	---
Melvin silt loam	3	2	2	1	2	2	2	4	2	1	2
Morganfield silt loam	1	1	1	1	3	4	4		1		4
Mountview silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Mountview silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Needmore silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Needmore silty clay loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Needmore silty clay, 6 to 12 percent slopes, severely eroded	3	2	2	2	2	4	4	4	2	2	4
Newark silt loam	2	1	1	1	3	3	3	3	1	1	3
Nolichucky fine sandy loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Pembroke silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Pembroke silt loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded	3	2	1	1	3	4	4	4	2	2	4
Robinsonville gravelly silt loam	2	1	1	1	3	4	4	4	1	1	4
Rock land	4	4	3	3	1	4	4	4	4	3	4
Roellen silty clay loam	4	3	3	1	1	1	2	4	3	1	3
Sango silt loam, 0 to 2 percent slopes	2	1	1	1	3	3	3	3	1	1	3
Sango silt loam, 2 to 6 percent slopes	2	2	1	1	3	4	4	4	1	2	4
Staser silt loam	1	1	1	1	3	4	4	4	1	1	4
Taft silt loam	3	3	2	2	2	2	2	2	3	2	2
Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Talbott silty clay loam, 2 to 6 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Talbott silty clay loam, 6 to 12 percent slopes, eroded	2	1	1	1	3	4	4	4	1	1	4
Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded	3	2	1	1	3	4	4	4	2	2	4
Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded	3	2	1	1	3	4	4	4	2	2	4
Tarklin cherty silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Tarklin cherty silt loam, 6 to 12 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Weikert and Ramsey stony soils, 12 to 20 percent slopes	4	3	2	2	2	4	4	4	3	2	4
Weikert and Ramsey stony soils, 20 to 50 percent slopes	4	3	2	2	2	4	4	4	3	2	4
Wellston silt loam, 6 to 12 percent slopes	2	1	1	1	3	4	4	4	1	1	4
Zanesville silt loam, 2 to 6 percent slopes	2	1	1	1	3	4	4	4	1	1	4

Figure 14.—Severely eroded, clayey Talbott soil made useful by planting pines and multiflora rose for wildlife cover near a pond.

Coniferous woody plants.—These are coniferous trees and shubs that are mainly important to wildlife as cover. They may furnish food in the form of browse, seeds, or fruitlike cones. These plants are commonly established through natural processes but may be planted. Examples are spruce pine (fig. 14), white-cedar, hemlock, eastern redcedar, juniper, and yew.

Wetland food and cover plants.—These are annual and perennial, wild, herbaceous plants in moist to wet sites that produce food or cover for, or are extensively and dominantly used by, wetland forms of wildlife. Submerged and floating aquatic plants are not in this group. Examples of wetland food and cover plants are smartweed, wild millet, bulrush, spike-sedge, rushes, sedges, burreeds, wildrice, rice cutgrass, and cattails.

Shallow water developments.—These are impoundments, excavations, or water controls. The water in these developments generally does not exceed 6 feet in depth. Examples of shallow water developments are low dikes, low levees, shallow dugouts, level ditches, and devices for controlling the water level in marshy drainageways or channels.

Excavated ponds.—These are dug-out areas containing water and combinations of dug-out areas and low dikes (dammed areas) that have water suitable in quality, depth, and supply for the production of fish or wildlife. Examples are ponds built on nearly level land that are at least one-fourth acre in size, have an average depth of 6 feet in at least one-fourth of their area, and have a dependable source of water, such as a dependably high water table.

Classes of Wildlife

The three classes of wildlife listed in table 3 are defined in the following paragraphs.

Openland wildlife.—This class consists of birds and mammals that normally make their homes in cultivated fields, pastures, meadows, lawns, and areas overgrown with grasses, herbs, and shrubby plants. Examples are quail, meadowlarks, field sparrows, doves, cottontail rabbits, red foxes, and woodchucks.

Woodland wildlife.—This class consists of birds and mammals that normally make their homes in areas wooded with hardwood trees and shrubs, coniferous trees and shrubs, or mixtures of such plants. Examples are ruffed grouse, woodcock, thrushes, vireos, scarlet tanagers, gray squirrels, gray foxes, white-tailed deer, raccoons, and wild turkeys.

Wetland wildlife.—This class consists of birds and mammals that normally make their homes in wet areas, such as ponds, marshes, and swamps. Examples are ducks, geese, herons, shore birds, mink, muskrats, and beavers.

Engineering Applications [6]

This section contains information that will help engineers plan the construction of roads, buildings, and ponds, and erosion control, drainage, and irrigation facilities. See tables 4, 5, and 6. The soil properties most important to the engineer are permeability, shear strength, compaction characteristics, drainage, shrink-swell characteristics, grain size, plasticity, and the degree of acidity or alkalinity. Depth to the water table, depth to bedrock, and topography also are important.

Soil survey information can be used in—

1. Selecting and developing industrial, business, residential, and recreational sites.
2. Making preliminary estimates of the engineering properties of soils for the planning of agricultural drainage systems, farm ponds, irrigation systems, diversion terraces, and other developments.
3. Making preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at the selected locations.
4. Locating probable sources of road fill and topsoil.
5. Correlating performance of engineering structures with soil mapping units and thus developing information that will be useful in designing and maintaining the structures.
6. Evaluating the suitability of the soils for cross-country movement of vehicles and construction equipment.
7. Supplementing the information obtained from other published maps, reports, and aerial photographs for use in preparing detailed maps and reports that can be used readily by engineers.
8. Developing preliminary estimates for construction purposes pertinent to a particular area.

Soil maps and soil descriptions are generalized. For specific engineering works and uses, onsite sampling and testing are needed, and use of this survey should be limited to general planning and to selection of locations for detailed onsite examinations.

Some terms used in this section may not familiar to engineers. Many of these terms are defined in the Glossary at the back of this survey.

Engineering Classification of Soils

The purpose of having engineering classifications of soil materials is to supply the engineer with ratings that have special meaning for engineering purposes. Many highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials (AASHO). In this system soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clayey soils that have low strength when wet. The estimated AASHO classification of all soils in Barren County is shown in table 5, page 56.

Some engineers prefer to use the Unified soil classification system that was established by the U.S. Army Corps of Engineers. In this system soils are identified according to their texture and plasticity and are grouped according to their performance as engineering construction materials. Soil materials are classified in 15 categories, of which eight are for coarse-grained material, six are for fine-grained material, and one is for highly organic material. The estimated Unified classification of all soils in Barren County is given in table 5.

Engineering Test Data

Samples of several Barren County soils were tested in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (*1*) to help evaluate the soils for engineering purposes. Table 4, page 54, lists data on the tests. The results of the tests are applicable only to the depths at which the samples were obtained.

Data on moisture density or compaction are given in this table. Dry density is the maximum test density of dry soil material and is expressed in pounds of soil material per cubic foot. Optimum moisture content is that percentage of moisture in soil material when the material is most dense upon compaction.

The tests for liquid limit and plastic limit measure the effect of water on the consistence of the soil materials. As the moisture content of a soil is increased from a dry state, the material changes from a semisolid to a plastic state. The moisture content at which this change occurs is called the plastic limit. As the moisture content is further increased, the material changes from a plastic to a liquid state. The moisture content at which this change occurs is called the liquid limit. The plastic and liquid limits are moisture contents, expressed as percentages of the ovendry weight of the soil. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

The AASHO and Unified classifications given in table 4 are based on test data obtained by mechanical analysis and the determination of the liquid and plastic limits of the soil materials. Mechanical analysis was made by combined sieve and hydrometer methods to determine the relative proportions of particles of different sizes in the soil materials.

Engineering Properties of the Soils

Table 5 gives the estimated engineering classification and properties of the materials at various depths in the

[6] By CHARLES L. MURPHY, assistant State conservation engineer, Soil Conservation Service.

soils of Barren County. The properties given for a soil are those of a single typical profile divided into horizons. A complete description of each soil is given in the section "Descriptions of the Soils." Gullied land (Gu), Made land (Ma), and Rock land (Ro) are not included in table 5.

Classification of soils according to the textural classes of the U.S. Department of Agriculture (*17*) is based on the percentages of sand, silt, and clay in the soils. Table 5 shows the classification of each important layer of the Barren County soils according to this system and according to the AASHO (*1*) and the Unified systems (*19*).

The percentages of soil material that pass through sieves of various sizes make up the estimated relative amounts of coarse-grained material. The percentage passing through the No. 200 sieve is the fine-grained part of the material. The estimates of size distribution given in table 5 are based on data obtained from tests made on Barren County soils and on similar soils in other areas.

Permeability is the quality of a soil that enables water or air to move through it. Terms used to describe permeability are expressed in inches per hour and are given in the Glossary in the back of this survey.

Available water capacity, expressed in table 5 in inches per inch of soil depth, refers to the approximate amount of water held by a soil that has been allowed to drain for 2 days after being saturated. It is the moisture that can be taken from the soil by plants. The estimates of available water capacity given in the table were based on the texture and structure of the soil materials and the percentages of coarse fragments in the materials.

Reaction, the estimated degree of acidity or alkalinity, is expressed as a pH value. The reaction of soils in Barren County is fairly uniform and ranges from pH 4.5 to pH 7.3.

The potential volume change, or shrink-swell potential, is that quality of a soil that determines how much its volume changes with a change in moisture content. The amount and type of clay in a soil and the organic-matter content are major factors affecting the shrink-swell potential. Other factors affecting the shrink-swell potential of a soil include the initial moisture content, the dry density, the degree of compaction, and the confining pressure.

Engineering Interpretations

Table 6 rates the soils of Barren County according to their suitability and limiting features for several uses relating to engineering. The engineering interpretations are based on test data given in table 4, on data from tests of similar soils in adjacent areas, and on field experience. Table 6, page 60, does not include Gullied land (Gu), Made land (Ma), and Rock land (Ro).

Susceptibility of a soil to frost action depends on the texture of the soil material, the depth to the water table during the freezing period, and the depth of frost penetration. Silts and fine sands that have a high water table are rated high in susceptibility to frost action. In exposed areas frost heaves soil material and increases its susceptibility to erosion.

The ratings given in table 6 that show relative suitability of the soils as a source of topsoil are based on the capability of the surface layer of the soil to support the growth of vegetation when it is spread as topdressing on road shoulders, slopes, and ditchbanks.

Suitability of soil material for road fill and road subgrade depends on plasticity, water content, compaction characteristics, erodibility, and the presence of rock within the normal depth of road excavation. Generally, sandy or coarse-textured soils are suitable for road fill or subgrade material, and very highly plastic clays are unsuitable.

In determining the suitability of a soil for the location of highways, the entire soil profile is evaluated in terms of factors relating to the soil in an undisturbed state. These factors include presence and thickness of organic material, depth to bedrock, presence of stones and boulders, ground water conditions, flood hazards, topography, and properties of the soil materials.

The suitability of a soil as a location for the reservoir area of a farm pond depends on those features and qualities of the undisturbed soil and those conditions of its underlying bedrock that affect suitability for water impoundments. Consideration needs to be given to permeability, seepage rates, depth to water table, depth to bedrock or other materials that would allow seepage, and topography affecting the water-storage potential.

Considered in determining the suitability of a soil for farm pond embankments are those features and qualities of the soil after it has been disturbed that affect its suitability for use in the construction of earth fills. If they are sufficiently thick to be used as borrow, both the subsoil and substratum are evaluated. The properties evaluated include those relating to stability, compaction, permeability, compressibility, and resistance to piping.

Considered in determining the suitability of a soil for agricultural drainage are those features and qualities of the soil that affect the installation and performance of surface and subsurface drainage facilities. These include permeability, texture, structure, depth to restricting layers, depth to the water table, flooding, and availability of outlets.

The suitability of a soil for irrigation depends on such features and qualities of the soil as water-holding capacity, water intake rate, depth to the water table, depth to restricting layers, and susceptibility to flooding and to water and wind erosion. Before an irrigation project is planned, it is desirable to have a feasibility study made by the county agricultural agent, by a representative of the Soil Conservation Service, or by some other qualified person or organization.

Factors affecting the stability, layout, and construction of terraces and diversions include length and steepness of slopes, depth to bedrock or other materials, availability of outlets, seepage, and stability of soil materials.

Factors limiting the suitability of a soil for grassed waterways include shallowness, stoniness, steepness, erodibility, and difficulties of establishing and maintaining plant growth.

TABLE 4.—*Engineering test data* [1] *for soil samples*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Moisture-density [2]: Maximum dry density	Moisture-density [2]: Optimum moisture	Mechanical analysis [3]: Estimated percentage discarded in field (3 in.)	Percentage passing sieve [4]— 3 in.	2 in.	1½ in.	1 in.
			Inches		*Lb. per cu. ft.*	*Percent*					
Baxter cherty silt loam: 3 miles W. of Glasgow on U.S. Hwy. 68 (modal).	Limestone (Warsaw formation).	S34477	0–8	Ap	109	16	----	----	----	----	----
		S34478	22–40	B22t	102	21	2	----	----	----	----
		S34479	40–58	B23t, C	105	19	20	80	74	70	66
1 mile E. of Beckton on State Hwy. 1530 (clay shale C horizon).	Cherty limestone.	S34480	0–8	Ap	108	15	----	----	100	96	95
		S34481	23–42	B3	103	22	----	----	100	97	96
		S34482	42–50	C	96	27	----	----	----	----	----
Bodine cherty silt loam: 3 miles E. of State Hwy. 63, near Glover Creek (flaggy chert).	Cherty limestone (Fort Payne formation).	S34486	0–8	Ap	108	16	----	----	100	98	98
		S34487	12–20	B, C1	110	17	30	70	69	69	66
		S34488	24–30	C2	110	16	40	60	58	56	52
1 mile S. of Temple Hill on State Hwy. 63 (flaggy chert).	Cherty limestone (Fort Payne formation).	S34483	0–8	Ap	102	18	2	----	98	94	91
		S34484	6–15	B	108	18	1	99	98	97	96
		S34485	15–19	C1	101	20	50	----	----	----	----
Cumberland cherty silt loam: 6 miles NW. of Glasgow on State Hwy. 90 (modal).	Limestone (St. Louis and Ste. Genevieve formations).	S34471	0–6	Ap	105	17	2	98	95	94	91
		S34472	16–28	B21, B22	92	28	----	----	100	98	94
		S34473	43–68	B23	94	27	45	----	55	49	44
1½ miles S. of Goodnight on U.S. Hwy. 31–E (light-textured upper subsoil).	Limestone (St. Louis and Ste. Genevieve formations).	S34474	0–6	Ap	109	15	2	98	97	96	94
		S34475	11–22	B21	112	15	5	95	91	89	85
		S34476	52–68	C	89	29	55	----	45	43	41
Dickson silt loam: 1½ miles N. of Bon Ayr on State Hwy. 255 (modal).	Cherty limestone (Warsaw formation).	S34489	1–8	A	112	14	----	----	----	----	----
		S34490	12–24	B2	114	15	----	----	----	----	----
		S34491	24–46	Bxt	115	14	----	----	----	----	----
		S34492	46–72	C	113	16	----	----	----	----	----
Sango silt loam: 3 miles NE. of Coral Hill at junction of State Hwys. 740 and 821 (modal).	Cherty limestone.	S34497	1–8	A	112	13	----	----	----	----	----
		S34498	14–24	B2	115	14	----	----	----	----	----
		S34499	24–40	Bx1t	112	16	----	----	----	100	98
		S34500	40–55	Bx2t	105	19	----	100	97	97	96
3 miles E. of State Hwy. 63, near Glover Creek (shallow).	Cherty limestone (Fort Payne formation).	S34501	2–8	A2	106	16	----	----	----	----	----
		S34502	8–15	B2	109	16	----	----	----	----	----
		S34503	20–31	B3m2	105	20	----	----	----	----	----

[1] Tests performed by the Bureau of Public Roads (BPR) in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] Based on method described in Moisture-Density Relations of Soils Using a 5.5-lb. Rammer and a 12-in. Drop, AASHO Designation T 99–57, Method A (*1*).

[3] Mechanical analyses according to AASHO Designation T 88–57 (*1*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

taken from nine soil profiles, Barren County, Ky.

Mechanical analysis[3]—Continued									Liquid limit	Plasticity index	Classification	
Percentage passing sieve[4]—Continued					Percentage smaller than [4]—						AASHO [5]	Unified [6]
¾ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
									Percent			
100	98	92	86	80	76	52	20	11	28	5	A-4(8)	ML-CL
98	96	95	92	87	84	73	51	41	54	24	A-7-5(16)	MH-CH
64	58	56	54	47	46	36	24	18	42	17	A-7-6(8)	GM-GC
94	90	88	84	76	73	51	21	11	27	5	A-4(8)	ML-CL
95	95	94	93	87	85	76	60	48	52	26	A-7-6(17)	MH-CH
100	97	95	91	88	86	81	64	54	70	36	A-7-5(20)	MH-CH
97	87	81	72	67	66	52	24	16	31	8	A-4(6)	ML-CL
64	56	54	48	45	43	34	18	13	32	10	A-4(6)	GM-GC
47	33	31	28	25	24	19	10	6	28	6	A-2-4	GM-GC
89	80	78	72	67	65	51	24	16	33	7	A-4(7)	ML
96	90	86	80	77	75	60	36	24	32	10	A-4(8)	ML-CL
--------	--------	50	45	42	41	34	20	13	33	7	A-4(8)	SM
89	85	83	80	74	72	53	19	10	32	6	A-4(8)	ML
92	89	88	87	86	85	78	64	60	72	39	A-7-5(20)	MH-CH
41	35	33	32	31	31	28	23	20	68	37	A-2-7	GM-GC
93	92	91	89	84	83	66	24	13	29	6	A-4(8)	ML-CL
83	74	72	70	66	65	51	26	18	37	14	A-6(9)	ML-CL
41	38	37	37	35	34	31	27	24	73	36	A-2-7	GM
--------	--------	100	99	86	84	63	23	16	25	5	A-4(8)	ML-CL
--------	--------	100	99	87	85	66	30	22	31	10	A-4(8)	ML-CL
--------	--------	100	98	82	80	63	27	18	28	7	A-4(8)	ML-CL
--------	--------	100	98	74	72	60	38	30	37	15	A-6(10)	CL
--------	99	97	93	78	76	53	18	11	21	2	A-4(8)	ML
100	98	97	93	80	78	59	28	20	29	9	A-4(8)	CL
97	92	90	86	75	72	58	30	20	32	10	A-4(8)	ML-CL
95	91	89	84	67	62	53	39	32	48	20	A-7-6(12)	ML-CL
--------	--------	100	94	90	87	63	22	12	25	3	A-4(8)	ML
--------	--------	100	94	90	88	68	30	20	26	5	A-4(8)	ML-CL
--------	--------	100	93	88	86	72	47	35	40	16	A-6(10)	ML-CL

[4] Based on total amount of material. Laboratory test data were corrected for amount discarded in field sampling.

[5] Based on methods described in "Standard Specifications for Highway Materials and Methods of Sampling and Testing" (Pt. 1, Ed. 8): "The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes," AASHO Designation M 145-49 (*1*).

[6] Based on the "Unified Soil Classification System," Technical Memorandum No. 3-357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953 (*19*). SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points of the A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are MH-CH and GM-GC.

TABLE 5.—*Estimated engineering*

Soil series and map symbols	Depth to— Seasonal high water table	Depth to— Rock	Depth from surface	Classification: USDA texture
	Feet	*Feet*	*Inches*	
Baxter (BaB, BaC2, BaD2, BaE2, BcD3, BeD2, BeE2)	6+	2½–10	0–8	Cherty silt loam
			8–22	Cherty silty clay loam
			22–52	Cherty silty clay
			52–72	Chert beds
Bodine (BoC, BoD, BoE)	6+	3–6	0–6	Cherty silt loam
			6–24	Very cherty silt loam
			24–43	Very cherty silt loam
			43	Cherty limestone bedrock
Caneyville (CaD2, CcD3)	6+	1½–3	0–6	Very rocky silty clay loam
			6–25	Silty clay loam to silty clay
			25–35	Clay or silty clay
			35	Limestone or sandstone bedrock
Christian (CeB, CeC2, CeD2, ChC3, ChD3)	6+	4–7	0–6	Cherty loam
			6–13	Cherty sandy clay loam
			13–22	Cherty clay
			22–45	Cherty clay loam
			45–55	Cherty clay
Christian (ClB, ClC2, CmC3)	6+	4–7	0–14	Silt loam
			14–34	Silty clay
			34–46	Clay loam
Clarksville (CnB, CnC2, CnD2, CnE2)	6+	2½–5½	0–12	Cherty silt loam
			12–24	Cherty silt loam
			24–42	Very cherty silty clay loam
Crider (CrB, CrC2)	6+	5–10	0–7	Silt loam
			7–39	Silty clay loam or silt loam
			39–71	Silty clay
			71–78	Clay loam
Cumberland (CtB2, CtC2, CtD2, CuC3, CuD3)	6+	6–20	0–9	Cherty silt loam to silty clay loam.
			9–22	Cherty silty clay
			22–33	Cherty silty clay
			33–66	Cherty clay
Dickson (DcA, DcB, DcC2)	1½–2	4–7	0–28	Silt loam
			28–36	Silt loam (fragipan)
			36–72	Silty clay loam
Dowellton (Do)	0–½	4–6	0–18	Silt loam
			18–48	Silty clay
Fredonia (FdD2, FrC3)	6+	1½–3	0–5	Very rocky silty clay loam
			5–10	Silty clay loam
			10–18	Silty clay
			18–30	Clay
			30	Limestone bedrock
Garmon (GaB, GaC2, GaD, GaE, GmE3)	6+	1½–3	0–18	Shaly silt loam
			18–27	Shaly silt loam
			27	Shale or shaly limestone bedrock
Hamblen (Ha)	1½–2	6–10	0–34	Silt loam
			34–48	Silt loam
Humphreys (HuB, HuC2)	6+	3–10	0–16	Cherty silt loam or cherty silty clay loam.
			16–32	Cherty silty clay loam
			32–37	Sand, gravel, or silt loam
Melvin (Me)	0–½	6	0–44	Silt loam
Morganfield (Mf)	4–6	6	0–48	Silt loam

See footnote at end of table.

classification and properties of the soils

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Potential volume change (shrink-swell)
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	*Percent*
ML or CL	A–4 or A–6	65–95	60–90	50–90	0. 63–2. 0	0. 15	5. 5–6. 0	<2
CL, MH, or CH	A–6 or A–7	65–90	60–90	60–90	0. 63–2. 0	. 12	5. 1–5. 5	2–4
CH or MH	A–7	65–90	60–90	55–90	0. 2–2. 0	. 11	5. 1–5. 5	2–4
ML or CL	A–4 or A–6	65–90	60–90	50–90	0. 63–2. 0	. 13	5. 6–6. 0	<2
GM or ML	A–4	50–90	45–85	40–75	2. 0–6. 3	. 09	4. 5–5. 0	<1
GC or GM	A–2 or A–4	20–50	20–50	20–40	>6. 3	. 04	4. 5–5. 0	<1
CL or ML	A–4 or A–6	90–100	85–95	80–90	0. 63–2. 0	. 20	6. 1–6. 5	1–3
CL or CH	A–6 or A–7	95–100	90–100	85–95	0. 2–0. 63	. 16	6. 1–6. 5	2–6
CH or MH	A–7	95–100	95–100	90–95	0. 2–0. 63	. 16	5. 1–5. 5	2–6
ML or SM	A–4	60–90	55–90	40–70	0. 63–2. 0	. 12	6. 1–6. 5	<2
CL or SC	A–6 or A–2	60–90	55–90	15–50	0. 63–2. 0	. 11	6. 1–6. 5	1–4
CH or MH	A–7	60–90	55–90	50–90	0. 2–0. 63	. 09	5. 6–6. 0	2–4
CL, CH, or GC	A–6 or A–7	60–90	55–90	40–75	0. 2–0. 63	. 11	4. 5–5. 0	2–4
CH or MH	A–7	60–90	55–90	50–90	0. 2–0. 63	. 09	4. 5–5. 0	2–6
ML or CL	A–4 or A–6	85–100	80–100	65–100	0. 63–2. 0	. 22	4. 5–5. 5	<2
CH or MH	A–7	85–100	80–100	80–100	0. 2–2. 0	. 16	4. 5–5. 0	2–4
CL or CH	A–6 or A–7	85–100	80–100	55–85	0. 2–2. 0	. 17	4. 5–5. 0	1–4
ML or CL	A–4 or A–6	65–90	60–90	50–90	0. 63–2. 0	. 15	5. 1–6. 0	<1
ML or CL	A–4 or A–6	65–90	60–90	50–90	2. 0–6. 3	. 12	4. 5–5. 0	<2
ML or GM	A–4 or A–2	45–80	40–80	30–80	2. 0–6. 3	. 09	5. 1–5. 5	<1
ML or CL	A–4 or A–6	95–100	95–100	90–100	0. 63–2. 0	. 22	5. 1–5. 5	<2
CL or CH	A–6 or A–7	95–100	90–100	85–100	0. 63–2. 0	. 19	4. 5–5. 0	2–4
CH	A–7	95–100	90–100	85–100	0. 63–2. 0	. 16	4. 5–5. 0	2–4
CL or CH	A–6 or A–7	85–100	80–100	70–85	0. 63–2. 0	. 17	4. 5–5. 0	1–4
ML or CL	A–4 or A–6	65–90	60–90	50–90	0. 63–2. 0	. 15	6. 1–6. 5	<2
CL or CH	A–6 or A–7	65–90	60–90	55–90	0. 63–2. 0	. 12	5. 6–6. 0	1–4
CH or MH	A–7	65–90	60–90	55–85	0. 63–2. 0	. 11	5. 1–5. 5	2–4
CH, MH, or GC	A–7 or A–2	30–90	30–90	30–90	0. 2–2. 0	. 09	5. 1–5. 5	2–4
ML or CL	A–4	90–100	90–100	85–100	0. 63–2. 0	. 20	5. 1–6. 5	<2
ML or CL	A–4	100	90–100	85–100	<0. 2	. 18	4. 5–5. 0	<2
CL	A–6 or A–7	100	95–100	80–100	0. 2–0. 63	. 19	4. 5–5. 0	<2
ML or CL	A–4 or A–6	95–100	95–100	85–100	0. 63–2. 0	. 22	5. 6–6. 5	<2
CH or MH	A–7	95–100	95–100	90–100	<0. 2	. 16	6. 1–7. 3	2–6
ML or CL	A–4 or A–6	85–100	80–100	65–100	0. 63–2. 0	. 20	6. 1–6. 5	<2
CH or MH	A–6 or A–7	85–100	80–100	80–100	0. 2–0. 63	. 16	6. 1–6. 5	2–6
CH or MH	A–7	95–100	90–100	85–100	0. 2–0. 63	. 15	5. 1–5. 5	2–6
CH or MH	A–7	90–100	90–100	85–100	0. 2–0. 63	. 15	5. 1–6. 0	2–6
ML or CL	A–4 or A–6	75–90	70–90	55–85	0. 63–2. 0	. 13	6. 1–7. 3	<2
ML, CL, or GM	A–6 or A–7	55–85	50–80	45–80	0. 63–6. 3	. 11	6. 6–7. 3	1–4
ML or CL	A–4 or A–6	95–100	90–100	85–95	0. 63–2. 0	. 22	5. 6–6. 5	<2
ML or CL	A–4 or A–6	90–100	90–100	85–90	0. 63–2. 0	. 20	5. 6–6. 0	<2
ML or CL	A–4 or A–6	60–85	60–80	50–75	0. 63–2. 0	. 15	5. 5–6. 5	<2
CL or GC	A–6 or A–7	60–85	60–85	50–80	0. 63–6. 3	. 12	5. 6–6. 0	1–4
GM or SM	A–1 or A–2	40–80	35–50	20–45	0. 63–6. 3	. 03	5. 1–5. 5	(1)
ML or CL	A–4 or A–6	90–100	90–100	85–100	0. 63–2. 0	. 22	6. 1–6. 5	<2
ML or CL	A–4 or A–6	90–100	90–100	85–100	0. 63–2. 0	. 22	6. 1–7. 3	<2

TABLE 5.—*Estimated engineering*

Soil series and map symbols	Depth to— Seasonal high water table	Depth to— Rock	Depth from surface	Classification: USDA texture
	Feet	*Feet*	*Inches*	
Mountview (MoB, MoC2)	6+	4–8	0–32	Silt loam
			32–40	Silty clay loam
Needmore (NdB, NeC2, NmC3)	6+	2–3½	0–7	Silt loam
			7–13	Silty clay
			13–28	Silty clay
			28–36	Clay
Newark (Nn)	½–1	5	0–9	Silt loam
			9–40	Silt loam
			40	Chert bed
Nolichucky (NoB, NoC2)	6+	6	0–8	Fine sandy loam
			8–14	Clay loam
			14–24	Sandy clay loam
			24–68	Loam
Pembroke (PbB, PbC2, PeC3)	6+	6–10	0–9	Silt loam
			9–28	Silty clay loam
			28–34	Silty clay loam
			34–50	Silty clay
Ramsey. (Mapped only with Weikert soils)	6+	1–2	0–9	Stony fine sandy loam
			9–17	Stony fine sandy loam
			17	Sandstone bedrock
Robinsonville (Rg)	4+	6	0–38	Gravelly silt loam
Roellen (Rs)	0–½	5	0–19	Silty clay loam
			19–44	Silty clay
Sango (SaA, SaB)	1½–2	6	0–8	Silt loam
			8–23	Silt loam
			23–39	Silt loam (fragipan)
			39–46	Silty clay loam (fragipan)
Staser (St)	4+	6	0–48	Silt loam
Taft (Ta)	½–1	6–10	0–16	Silt loam
			16–21	Silt loam (fragipan)
			21–42	Silt loam (fragipan)
Talbott (TbB2, TbC2, TbD2, TcC3)	6+	3–10	0–5	Cherty silty clay loam
			5–18	Cherty silty clay
			18–61	Cherty clay
			61–83	Clay
Talbott (TlB2, TlC2)	6+	3–10	0–16	Silty clay loam
			16–46	Clay
Tarklin (TrB, TrC)	1½–2	5–10	0–12	Cherty silt loam
			12–23	Cherty silt loam to silty clay loam.
			23–40	Cherty silty clay loam (fragipan).
			40–53	Cherty clay loam to loam
Weikert (WrD, WrE) For properties of the Ramsey soils in these mapping units, refer to the Ramsey series.	6+	¾–2	0–12	Stony silt loam
			12	Siltstone and shale bedrock
Wellston (WsC)	6+	3–4	0–14	Silt loam
			14–38	Silty clay loam
			38	Siltstone, sandstone, and shale bedrock.
Zanesville (ZaB)	2	4–6	0–12	Silt loam
			12–28	Silty clay loam
			28–34	Silty clay loam (fragipan)
			34–46	Silty clay loam (fragipan)
			46	Sandstone, siltstone, and shale bedrock.

[1] Negligible percentage.

classification and properties of the soils—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Potential volume change (shrink-swell)
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	*Percent*
ML or CL	A–4 or A–6	95–100	90–100	85–100	0. 63–2. 0	0. 22	4. 5–6. 0	<2
CL or CH	A–6 or A–7	90–100	85–95	80–95	0. 63–2. 0	. 19	4. 5–5. 0	1–4
ML or CL	A–4 or A–6	95–100	90–100	90–95	0. 63–2. 0	. 22	5. 6–6. 0	<2
CL or CH	A–6	95–100	95–100	95–100	0. 2–0. 63	. 16	5. 1–5. 5	2–4
MH or CH	A–7	90–100	85–100	85–100	0. 2–0. 63	. 16	5. 1–5. 5	2–6
MH or CH	A–7	80–95	75–95	70–95	0. 2–0. 63	. 12	6. 6–7. 3	4–6
ML or CL	A–4 or A–6	95–100	95–100	90–100	0. 63–2. 0	. 22	7. 4–7. 8	<2
ML, MH, or CL	A–6 or A–4	95–100	90–100	85–100	0. 63–2. 0	. 22	6. 6–7. 3	<2
ML or SM	A–2 or A–4	90–100	85–95	35–55	2. 0–6. 3	. 12	6. 6–7. 3	<2
CL	A–6	95–100	90–100	60–80	0. 63–2. 0	. 17	6. 6–7. 3	<2
SC or CL	A–6	85–100	85–100	25–50	0. 63–2. 0	. 17	5. 1–5. 5	<2
ML or CL	A–4 or A–6	85–95	80–95	50–75	0. 63–2. 0	. 18	5. 1–5. 5	<2
ML or CL	A–4 or A–6	95–100	95–100	90–100	0. 63–2. 0	. 22	5. 6–6. 0	<2
CL	A–6	95–100	95–100	90–100	0. 63–2. 0	. 19	5. 1–6. 0	<2
CL or CH	A–6 or A–7	95–100	90–100	85–95	0. 63–2. 0	. 19	5. 1–5. 5	2–4
MH or CH	A–7	85–100	80–100	75–100	0. 63–2. 0	. 16	4. 5–5. 0	2–9
SM, GM, or ML	A–2 or A–4	65–95	65–95	25–55	2. 0–6. 3	. 11	4. 5–5. 0	<2
SM or GM	A–2 or A–4	40–60	40–60	10–30	2. 0–6. 3	. 07	4. 5–5. 0	<2
ML or GM	A–2 or A–4	60–85	55–80	35–75	2. 0–6. 3	. 11	6. 1–6. 5	<2
CL	A–6	95–100	90–100	85–100	0. 63–2. 0	. 19	6. 1–6. 5	1–4
CH or MH	A–7	95–100	90–95	85–95	<0. 2	. 16	6. 1–7. 3	2–6
ML	A–4	95–100	95–100	85–95	0. 63–2. 0	. 22	5. 6–6. 0	<2
ML or CL	A–4 or A–6	95–100	95–100	85–95	0. 63–2. 0	. 22	4. 5–5. 5	<2
ML or CL	A–4 or A–6	90–100	90–100	85–95	<0. 2	. 17	4. 5–5. 0	<2
ML or CL	A–6 or A–7	85–100	80–95	75–95	<0. 2	. 19	4. 5–5. 0	1–4
ML or CL	A–4 or A–6	85–100	85–100	80–95	0. 63–2. 0	. 22	6. 1–7. 3	<2
ML	A–4	90–100	85–100	80–95	0. 63–2. 0	. 22	4. 5–5. 5	<2
ML or CL	A–4 or A–6	90–100	90–100	85–95	<0. 2	. 18	4. 5–5. 0	<2
ML or CL	A–6	85–100	80–100	80–95	<0. 2	. 18	4. 5–5. 0	<2
CL or CH	A–6 or A–7	60–90	55–90	55–85	0. 63–2. 0	. 13	6. 1–6. 5	1–4
CH or MH	A–7	60–90	55–90	55–90	0. 2–0. 63	. 11	5. 6–6. 0	2–4
CH or MH	A–7	75–90	70–90	60–90	0. 2–0. 63	. 10	5. 6–6. 0	2–4
CH or MH	A–7	85–100	80–100	75–95	<0. 2	. 15	5. 6–6. 0	2–6
CL or CH	A–6 or A–7	90–100	80–100	80–95	0. 2–0. 63	. 19	5. 6–6. 5	1–4
CH or MH	A–7	95–100	90–100	85–95	0. 2–0. 63	. 14	5. 6–6. 5	2–6
ML	A–4	65–90	60–85	55–80	0. 63–2. 0	. 15	6. 6–7. 3	<2
ML or CL	A–4 or A–6	65–90	60–85	50–80	0. 63–2. 0	. 15	4. 5–5. 0	<2
CL or CH	A–6 or A–7	65–85	60–80	55–75	0. 2–0. 63	. 12	4. 5–5. 0	<2
GC, ML, or CL	A–2, A–4, or A–6	55–80	45–80	40–75	0. 2–2. 0	. 11	4. 5–5. 0	<2
ML or GM	A–2 or A–4	40–70	30–60	25–55	2. 0–6. 3	. 10	4. 5–5. 0	<2
ML or CL	A–4 or A–6	95–100	90–100	85–100	0. 63–2. 0	. 22	5. 1–6. 5	<2
CL or CH	A–6 or A–7	90–100	85–95	85–95	0. 63–2. 0	. 19	5. 1–5. 5	2–4
ML or CL	A–4	95–100	95–100	85–100	0. 63–2. 0	. 22	5. 6–6. 0	<2
ML or CL	A–6	95–100	95–100	90–100	0. 63–2. 0	. 19	5. 1–5. 5	1–4
CL	A–6	90–100	90–100	85–95	<0. 2	. 17	5. 1–5. 5	1–4
CL or SC	A–4 or A–6	85–100	85–100	40–55	<0. 2	. 17	4. 5–5. 0	<2

TABLE 6.—*Engineering*

Soil series and map symbols	Susceptibility to frost action	Suitability as a source of—		Soil features that limit suitability for—
		Topsoil	Road fill	Highway location
Baxter (BaB, BaC2, BaD2, BaE2, BcD3, BeD2, BeE2).	Moderate	Poor	Poor to fair	Includes steep and very rocky areas; sinkholes.
Bodine (BoC, BoD, BoE)	Low	Poor	Fair to good	Depth to bedrock is 3 to 6 feet; slopes of 6 to 35 percent.
Caneyville (CaD2, CcD3)	Moderate	Poor	Poor	Depth to bedrock is 1½ to 3 feet; very rocky; sinkholes.
Christian (CeB, CeC2, CeD2, ChC3, ChD3, ClB, ClC2, CmC3).	Moderate	Fair	Poor to fair	Slopes of 2 to 20 percent; sinkholes may be present.
Clarksville (CnB, CnC2, CnD2, CnE2)	Low	Poor	Fair	Slopes of 2 to 30 percent; depth to rock is 2½ to 5½ feet.
Crider (CrB, CrC2)	Moderate	Good	Fair to good	Slopes of 2 to 12 percent; sinkholes in some areas.
Cumberland (CtB2, CtC2, CtD2, CuC3, CuD3).	Moderate	Fair to poor	Poor to fair	Sinkholes; slopes of 2 to 20 percent
Dickson (DcA, DcB, DcC2)	Moderate	Fair	Fair	Depth to seasonal water table is 1½ to 2 feet.
Dowellton (Do)	Moderate to high	Poor	Poor	Seasonal water table at surface; compressible in place.
Fredonia (FdD2, FrC3)	Moderate	Poor	Poor to fair	Sinkholes; depth to rock is 1½ to 3 feet; very rocky.
Garmon (GaB, GaC2, GaD, GaE, GmE3).	Low to moderate	Fair	Fair	Slopes of 2 to 35 percent; depth to rock is 1½ to 3 feet.
Hamblen (Ha)	Moderate to high	Good	Poor to fair	Subject to flooding; depth to seasonal high water table is 1½ to 2 feet.
Humphreys (HuB, HuC2)	Moderate	Poor to fair	Poor to good	None
Melvin (Me)	Moderate to high	Fair to good	Poor to fair	Seasonal water table at surface; subject to flooding.

interpretations

Soil features that limit suitability for—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
Reservoir area	Embankment				
Some steep areas; bedrock creviced in places.	Moderate shrink-swell potential; some areas are very rocky.	Not needed	Includes steep and very rocky areas.	Includes slopes of more than 8 percent and very rocky areas.	Includes steep and very rocky areas.
Pervious, cherty substratum.	Moderate piping hazard.	Not needed	Rapid permeability; many areas are steep.	Includes slopes of more than 8 percent.	Steep slopes; low fertility; chert content; droughty.
Creviced bedrock in some areas.	Moderate to high shrink-swell potential; amount of material limited.	Not needed	Includes steep and severely eroded areas; very rocky.	Very rocky; most slopes are greater than 8 percent.	Very rocky; includes steep areas.
None in soils; underlain by pervious bedrock in places.	Moderate shrink-swell potential.	Not needed	Slopes of 2 to 20 percent; some areas are severely eroded.	Slopes of 2 to 20 percent.	Slopes of 2 to 20 percent.
Pervious substratum is common.	Poor to fair stability.	Not needed	Slopes of 2 to 30 percent.	Slopes of 2 to 30 percent.	Slopes of 2 to 30 percent.
Pervious bedrock in places.	Moderate shrink-swell potential.	Not needed	None	None	None.
Creviced bedrock in places.	Moderate shrink-swell potential.	Not needed	Slopes of 2 to 20 percent; some areas are severely eroded.	Karst topography is common; slopes of 2 to 20 percent.	Cherty.
None	None	Fragipan at a depth of 2 to 2½ feet.	Fragipan at depth of 2 to 2½ feet.	None	None.
None	Moderate to high shrink-swell potential; poor stability.	Seasonal water table at surface; slow permeability; outlet sites lacking in some areas.	Seasonal water table at surface; slow permeability.	Not needed	Seasonal water table at surface.
Sinkholes; creviced bedrock is common.	Amount of material limited; moderate to high shrink-swell potential.	Not needed	Slopes of 6 to 20 percent; very rocky; includes severely eroded areas.	Slopes of 6 to 20 percent; shallow to moderately deep; very rocky; rock outcrops.	Very rocky; rock outcrops.
Pervious substratum in some areas.	Amount of material limited.	Not needed	Slopes of 2 to 35 percent; shallow to moderately deep.	Slopes of 2 to 35 percent; shallow to moderately deep.	Slopes of 2 to 35 percent; shallow to moderately deep.
Pervious substratum.	Subject to piping	Subject to flooding	None	None	None.
Pervious substratum.	Subject to piping	Not needed	None	Cherty; slopes of 2 to 12 percent.	Cherty.
Pervious substratum.	Subject to piping; poor stability.	Subject to flooding; outlet sites lacking in some areas; seasonal water table at surface.	Seasonal water table at surface; flood hazard.	Subject to flooding; seasonal water table at surface.	Seasonal water table at surface.

TABLE 6.—*Engineering*

Soil series and map symbols	Susceptibility to frost action	Suitability as a source of—		Soil features that limit suitability for—
		Topsoil	Road fill	Highway location
Morganfield (Mf)	Moderate to high	Good	Poor to fair	Subject to flooding
Mountview (MoB, MoC2)	Moderate	Fair to good	Fair	None
Needmore (NdB, NeC2, NmC3)	Moderate	Poor	Poor	Depth to bedrock is 2 to 3½ feet
Newark (Nn)	Moderate to high	Fair to good	Poor to fair	Depth to seasonal water table is 1 to 2 feet; subject to flooding.
Nolichucky (NoB, NoC2)	Low	Fair	Fair to good	Depth to bedrock ranges from 2 to 10 feet.
Pembroke (PbB, PbC2, PeC3)	Low to moderate	Good	Fair	None
Ramsey. (Mapped only with Weikert soils.)	Low	Poor	Fair but limited in amount; shallow to bedrock.	Shallow to bedrock; stony
Robinsonville (Rg)	Low to moderate	Poor	Good	Subject to flooding
Roellen (Rs)	Moderate to high	Poor	Poor	Seasonal water table at surface; subject to flooding.
Sango (SaA, SaB)	Moderate	Fair	Fair	Seasonal water table is 1½ to 2 feet from surface; seepage.
Staser (St)	Low to moderate	Good	Poor to fair	Subject to flooding; cavernous bedrock.
Taft (Ta)	Moderate	Fair	Poor to fair	Seasonal water table is 1 to 2 feet from surface.
Talbott (TbB2, TbC2, TbD2, TcC3, TlB2, TlC2).	Low to moderate	Poor	Poor	Some rock outcrops; slopes of 2 to 20 percent.
Tarklin (TrB, TrC)	Moderate	Poor	Poor to fair	Seasonal water table is 1½ to 2 feet from surface; seepage.

interpretations—Continued

Soil features that limit suitability for—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
Reservoir area	Embankment				
Pervious substratum.	Subject to piping; poor stability.	Not needed	None	Subject to flooding.	None.
Bedrock creviced in places.	None	Not needed	None	None	None.
None	Moderate to high shrink-swell potential.	Not needed	Slow intake in severely eroded areas.	Slopes of 2 to 12 percent.	None.
Pervious substratum.	Subject to piping; fair stability.	Depth to seasonal water table is 1 to 2 feet; subject to flooding.	Depth to seasonal water table is 1 to 2 feet; subject to flooding.	Subject to flooding; depth to seasonal water table is 1 to 2 feet.	Subject to flooding; depth to seasonal water table is 1 to 2 feet.
Pervious substratum in places.	None	Not needed	None	None	None.
Creviced bedrock in places.	Material below 3 feet may have fair to poor stability.	Not needed	None	None	None.
Shallow to bedrock; pervious throughout profile.	Stoniness; piping hazard; amount of material limited.	Not needed	Stoniness; steepness; low yields; moderately rapid permeability; low water-holding capacity.	Stoniness; steepness; shallow to bedrock.	Stoniness; steepness; droughtiness; low fertility; shallow to bedrock.
Pervious throughout profile.	Subject to piping	Flood hazard	Moderately rapid permeability.	Gravelly	Gravelly.
None	Subject to flooding; moderate to high shrink-swell potential; poor workability and compaction.	Seasonal high water table; slow permeability; outlet sites lacking in some areas; flooding.	Flooding; slow permeability; seasonal water table at surface.	Subject to flooding; seasonal water table at surface.	Seasonal water table at surface; subject to flooding.
None	Fair stability	Slowly permeable fragipan at a depth of about 20 to 26 inches.	Slowly permeable fragipan at a depth of about 20 to 26 inches.	None	Seepage on top of fragipan.
Pervious substratum and cavernous bedrock.	Fair to poor stability and piping resistance.	Not needed	None	None	None.
None	Fair stability	Slowly permeable fragipan at a depth of about 12 to 19 inches; seasonal high water table.	Seasonal water table is 1 to 2 feet from surface; fragipan at a depth of about 12 to 19 inches.	None	Seasonal high water table and seepage on top of fragipan.
Bedrock may be creviced; pervious bedrock.	Medium to high compressibility; fair to poor compaction.	Not needed	Medium to low infiltration; slopes of 2 to 20 percent.	Slopes of 2 to 20 percent.	Poor workability in severely eroded areas.
Bedrock may be creviced; may have pervious substratum.	Fair stability	Slowly permeable fragipan at depth of 20 to 28 inches; seasonal high water table.	Slowly permeable fragipan at a depth of 20 to 28 inches.	None	None.

TABLE 6.—*Engineering*

Soil series and map symbols	Susceptibility to frost action	Suitability as a source of—		Soil features that limit suitability for—
		Topsoil	Road fill	Highway location
Weikert (WrD, WrE). For interpretations of Ramsey soils in these mapping units, refer to the Ramsey series.	Low	Poor	Fair to poor but limited in amount.	Shallow to bedrock
Wellston (WsC)	Moderate	Fair	Fair	Depth to bedrock is 3 to 4 feet
Zanesville (ZaB)	Moderate	Fair	Fair	None

Use of the Soils for Nonfarm and Recreational Developments[7]

The abundant resources of land and water in Barren County offer promising opportunities for rural areas development and recreation (fig. 15). Outdoor space, in itself, is an important resource in this day of crowded city dwelling.

Recreation can be a primary use of certain areas, but it is more likely to be part of a multiple-use scheme for rural development. Soil, water, plants, and wildlife need to be skillfully managed if they are to provide opportunities for outdoor enjoyment and for monetary gain on the part of landowners. Recreational enterprises are important segments of rural areas development.

Soils are an important factor in the planning of most nonfarm and recreational uses of land. The information in this section points out soil-related limitations and problems that may be encountered in such uses. The most severe limitations listed may be overcome if the cost involved can be justified. The information is not intended to eliminate the need for onsite investigations for specific uses but rather serves as a guide for screening sites for planning more detailed investigations.

Table 7 shows the estimated degree of limitation of each of the survey mapping units for selected nonfarm and recreational uses of the soils of Barren County. In cases of *moderate* and *severe* limitations, the table gives the kind or kinds of limitations. Following are the three degrees of limitations used in the table and their meanings:

Slight.—Limitations, if any, are of minor consequence and are easy to overcome.

Moderate.—Limitations are of a magnitude to require careful planning, design, and management. The cost of measures to correct or overcome the limitations is an important consideration.

Severe.—Limitations are serious enough that the cost of corrective measures may be too high to justify the intended use of the soil or site.

[7] By E. V. HUFFMAN, assistant State soil scientist, Soil Conservation Service.

The kinds of limitations are expressed in terms of soil characteristics or properties. Some of these terms that may not be found in a standard dictionary or that have special meaning are defined in the Glossary in the back of this survey.

Various criteria were used in determining the degrees and kinds of soil-related limitations expressed in table 7. The ratings are explained in the paragraphs that follow.

The ratings of limitations of soils for septic tank filter fields are based on soil permeability, depth to a seasonal water table, depth to bedrock, surface rockiness, slope, surface stoniness, and flood hazard. Hazards of possible pollution of water supplies are not covered in the table. Where they exist they are a severe limitation.

The ratings for sites for buildings, including dwellings, and service buildings of three stories or less that have basements, are based on depth to a seasonal water table, depth to bedrock, slope, surface rockiness, surface stoniness, flood hazard, frost action, and shrink-swell potential. Slope is a more restrictive factor for subdivision locations than for other sites.

The ratings for campsites (trailer and tent) are based on depth to bedrock, permeability, depth to a seasonal water table, surface rockiness, surface stoniness, texture of the surface soil, and flood hazard. Slope is a more restrictive factor for trailer parks than for tenting areas.

The ratings for county and access roads are for normal hard-surface roads used by traffic in the county, including traffic in small towns. The ratings are based on depth to a seasonal water table, slope, depth to rock, surface rockiness, surface stoniness, and flood hazard.

The ratings for streets and parking lots in subdivisions are based on depth to a seasonal water table, slope, depth to rock, surface rockiness, surface stoniness, and flood hazard. Slope is a more restrictive factor for parking lots and streets than for county and access roads.

The ratings for athletic fields are based on depth to a seasonal water table, permeability, slope, depth to bedrock, surface rockiness, surface stoniness, texture of the surface soil, and flood hazard. Athletic fields, including baseball, football, and volleyball fields, normally must be nearly level. The surface of such fields is subject to hard use.

interpretations—Continued

Soil features that limit suitability for—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
Reservoir area	Embankment				
Shallow to pervious bedrock.	Piping hazard; fair stability; amount of material limited.	Not needed	Shallow to bedrock; low water-holding capacity; low yields.	Steepness; shallow to bedrock.	Steepness and droughtiness; shallow to bedrock.
None	Fair stability	Not needed	None	None	None.
None	Fair stability	Not needed	None	None	None.

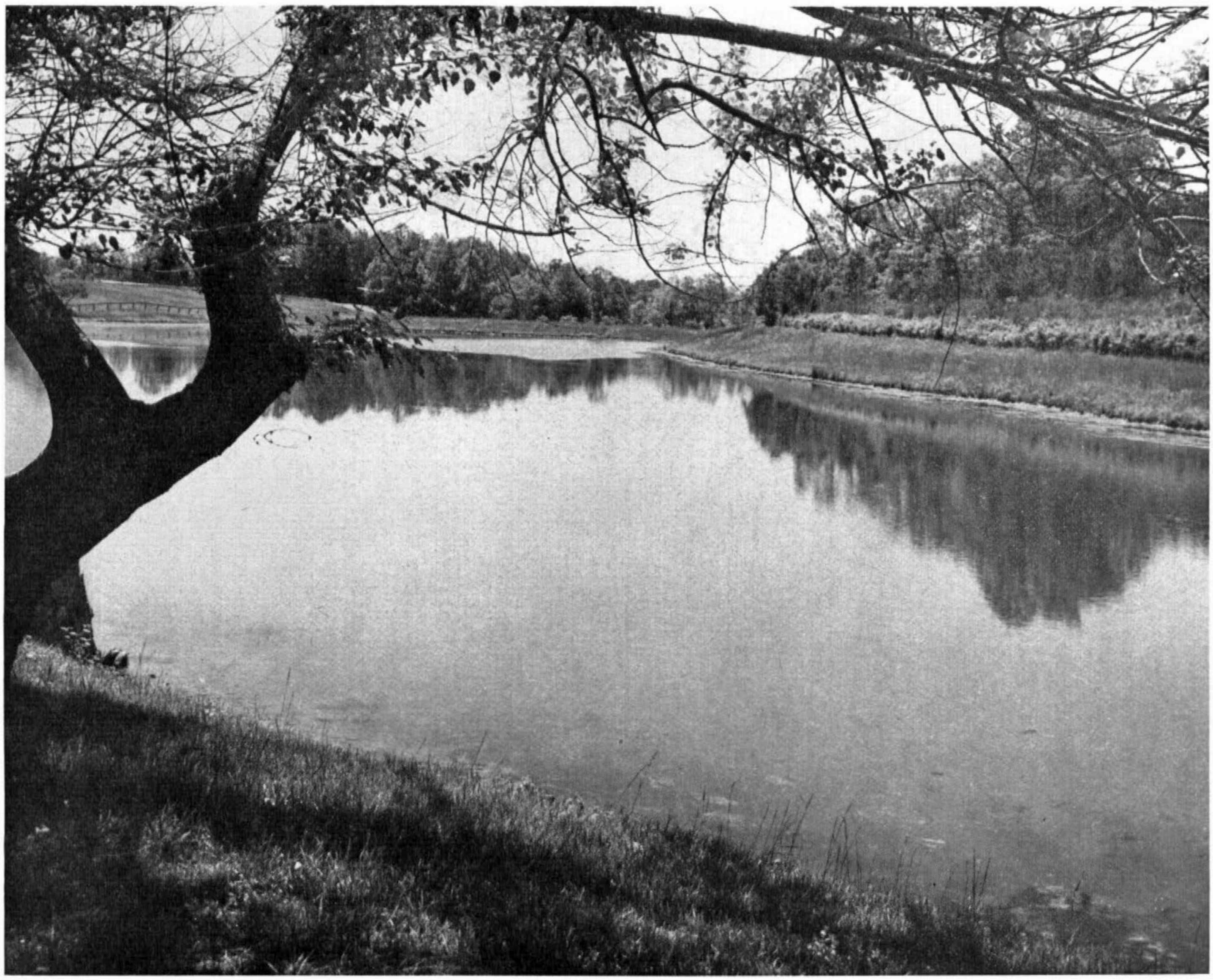

***Figure 15.*—A lake used for fishing and other recreation. It is surrounded by multiflora rose, pine, and locust plantings on a strongly sloping Talbott cherty silty clay loam.**

TABLE 7.—*Limitations of soils for*

Map symbol	Name of mapping unit	Estimated degree of limitation and kind of limitation if limitation is moderate or severe		
		Septic tank filter fields	Buildings with basements	Campsites
				Trailer
BaB	Baxter cherty silt loam, 2 to 6 percent slopes.	Slight	Slight	Moderate: slope; coarse fragments.
BaC2	Baxter cherty silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
BaD2	Baxter cherty silt loam, 12 to 20 percent slopes, eroded.	Severe: slope	Moderate: slope	Severe: slope
BaE2	Baxter cherty silt loam, 20 to 30 percent slopes, eroded.	Severe: slope	Moderate: slope	Severe: slope
BcD3	Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded.	Severe: slope	Moderate: slope	Severe: slope
BeD2	Baxter very rocky silt loam, 6 to 20 percent slopes, eroded.	Severe: slope; rock outcrops.	Severe: rock outcrops	Severe: slope
BeE2	Baxter very rocky silt loam, 20 to 30 percent slopes, eroded.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope
BoC	Bodine cherty silt loam, 6 to 12 percent slopes.	Moderate: slope	Moderate: slope	Severe: coarse fragments; slope.
BoD	Bodine cherty silt loam, 12 to 20 percent slopes.	Severe: slope	Moderate: slope	Severe: coarse fragments; slope.
BoE	Bodine cherty silt loam, 20 to 35 percent slopes.	Severe: slope	Severe: slope	Severe: coarse fragments; slope.
CaD2	Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded.	Severe: shallow to moderate depth to rock; moderately slow permeability; slope; rock outcrops.	Severe: rock outcrops; shallow to moderate depth to rock.	Severe: slope
CcD3	Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded.	Severe: shallow to moderate depth to rock; moderately slow permeability; slope; rock outcrops.	Severe: rock outcrops; shallow to moderate depth to rock.	Severe: slope; surface soil texture.
CeB	Christian cherty loam, 2 to 6 percent slopes.	Severe: moderately slow permeability.	Slight	Moderate: moderately slow permeability; slope.
CeC2	Christian cherty loam, 6 to 12 percent slopes, eroded.	Severe: moderately slow permeability.	Moderate: slope	Severe: slope
CeD2	Christian cherty loam, 12 to 20 percent slopes, eroded.	Severe: moderately slow permeability; slope.	Moderate: slope	Severe: slope
ChC3	Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded.	Severe: moderately slow permeability.	Moderate: slope	Severe: slope
ChD3	Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded.	Severe: moderately slow permeability; slope.	Moderate: slope	Severe: slope
ClB	Christian silt loam, 2 to 6 percent slopes.	Severe: moderately slow permeability.	Slight	Moderate: moderately slow permeability; slope.

nonfarm and recreational developments

Estimated degree of limitation and kind of limitation if limitation is moderate or severe—Continued					
Campsites—Con.: Tent	County and access roads	Streets and parking lots in subdivisions	Athletic fields	Play and picnic areas	Lawns, landscaping, and golf fairways
Moderate: coarse fragments.	Slight	Moderate: slope	Moderate: slope; coarse fragments.	Slight	Slight.
Moderate: slope; coarse fragments.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: slope; rock outcrops.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.
Severe: slope	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope; rock outcrops.
Severe: coarse fragments.	Moderate: slope	Severe: slope	Severe: slope	Severe: coarse fragments.	Severe: coarse fragments.
Severe: coarse fragments; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: coarse fragments; slope.	Severe: slope; low available moisture capacity; coarse fragments.
Severe: coarse fragments; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: coarse fragments; slope.	Severe: slope; low available moisture capacity; coarse fragments.
Severe: slope; surface soil texture.	Severe: slope; depth to rock; rock outcrops.	Severe: slope; shallow to moderate depth to rock; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope	Severe: slope; rock outcrops.
Severe: slope; surface soil texture.	Severe: slope; depth to rock; rock outcrops.	Severe: slope; shallow to moderate depth to rock; rock outcrops.	Severe: slope; rock outcrops; surface soil texture.	Severe: slope; surface soil texture.	Severe: slope; rock outcrops; surface soil texture.
Moderate: moderately slow permeability.	Slight	Moderate: slope	Moderate: slope	Slight	Slight.
Moderate: moderately slow permeability; slope.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: slope; moderately slow permeability.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope; surface soil texture.	Moderate: slope; surface soil texture.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: moderately slow permeability.	Slight	Moderate: slope	Moderate: slope	Slight	Slight.

TABLE 7.—*Limitations of soils for nonfarm*

Map symbol	Name of mapping unit	Estimated degree of limitation and kind of limitation if limitation is moderate or severe		
		Septic tank filter fields	Buildings with basements	Campsites: Trailer
ClC2	Christian silt loam, 6 to 12 percent slopes, eroded.	Severe: moderately slow permeability.	Moderate: slope	Severe: slope
CmC3	Christian silty clay loam, 6 to 12 percent slopes, severely eroded.	Severe: moderately slow permeability.	Moderate: slope	Severe: slope
CnB	Clarksville cherty silt loam, 2 to 6 percent slopes.	Slight	Slight	Moderate: coarse fragments; slope.
CnC2	Clarksville cherty silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
CnD2	Clarksville cherty silt loam, 12 to 20 percent slopes, eroded.	Severe: slope	Moderate: slope	Severe: slope
CnE2	Clarksville cherty silt loam, 20 to 30 percent slopes, eroded.	Severe: slope	Severe: slope	Severe: slope
CrB	Crider silt loam, 2 to 6 percent slopes.	Slight	Slight	Moderate: slope
CrC2	Crider silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
CtB2	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded.	Slight	Slight	Moderate: slope; coarse fragments.
CtC2	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
CtD2	Cumberland cherty silt loam, 12 to 20 percent slopes, eroded.	Severe: slope	Moderate: slope	Severe: slope
CuC3	Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded.	Moderate: slope	Moderate: slope	Severe: slope; surface soil texture.
CuD3	Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded.	Severe: slope	Moderate: slope	Severe: slope; surface soil texture.
DcA	Dickson silt loam, 0 to 2 percent slopes.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.
DcB	Dickson silt loam, 2 to 6 percent slopes.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.
DcC2	Dickson silt loam, 6 to 12 percent slopes, eroded.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table; slope.	Severe: slow permeability; fragipan; slope.
Do	Dowellton silt loam	Severe: seasonal high water table; slow permeability.	Severe: seasonal high water table; frost action.	Severe: seasonal high water table; slow permeability.
FdD2	Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded.	Severe: slope; depth to rock; moderately slow permeability.	Severe: depth to rock; rock outcrops.	Severe: slope
FrC3	Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded.	Severe: depth to rock 20 to 36 inches; moderately slow permeability.	Severe: depth to rock 20 to 36 inches; rock outcrops.	Severe: slope; surface soil texture.

and recreational developments—Continued

Estimated degree of limitation and kind of limitation if limitation is moderate or severe—Continued					
Campsites—Con.	County and access roads	Streets and parking lots in subdivisions	Athletic fields	Play and picnic areas	Lawns, landscaping, and golf fairways
Tent					
Moderate: moderately slow permeability; slope.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: slope; moderately slow permeability.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope; surface soil texture.	Moderate: slope; surface soil texture.
Moderate: coarse fragments.	Slight	Moderate: slope	Moderate: coarse fragments; slope.	Slight	Slight.
Moderate: coarse fragments; slope.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Slight	Slight	Moderate: slope	Moderate: slope	Slight	Slight.
Moderate: slope	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: coarse fragments.	Slight	Moderate: slope	Moderate: slope; coarse fragments.	Slight	Slight.
Moderate: coarse fragments; slope.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: surface soil texture.	Moderate: slope	Severe: slope	Severe: slope; surface soil texture.	Severe: surface soil texture.	Severe: surface soil texture.
Severe: slope; surface soil texture.	Severe: slope	Severe: slope; surface soil texture.	Severe: slope; surface soil texture.	Severe: slope; surface soil texture.	Severe: slope; surface soil texture.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.	Slight	Slight.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Moderate: slope; seasonal high water table.	Severe: slow permeability; fragipan.	Slight	Slight.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table; slope.	Severe: slope	Severe: slow permeability; fragipan; slope.	Moderate: slope	Moderate: slope.
Severe: slow permeability.	Severe: seasonal high water table; frost action.	Severe: seasonal high water table; frost action.	Severe: seasonal high water table; slow permeability.	Severe: seasonal high water table.	Severe: seasonal high water table; shallow root depth.
Severe: slope	Severe: slope; depth to rock; rock outcrops.	Severe: slope; depth to rock; rock outcrops.	Severe: slope; rock outcrops.	Severe: slope	Severe: slope; rock outcrops.
Severe: surface soil texture.	Severe: rock outcrop; depth to rock 20 to 36 inches.	Severe: slope; depth to rock; rock outcrops.	Severe: surface soil texture; rock outcrops.	Severe: surface soil texture.	Severe: surface soil texture; rock outcrops.

TABLE 7.—*Limitations of soils for nonfarm*

Map symbol	Name of mapping unit	Estimated degree of limitation and kind of limitation if limitation is moderate or severe		
		Septic tank filter fields	Buildings with basements	Campsites: Trailer
GaB	Garmon silt loam, 2 to 6 percent slopes.	Severe: depth to rock 20 to 36 inches.	Moderate: depth to rock 20 to 36 inches.	Moderate: slope.
GaC2	Garmon silt loam, 6 to 12 percent slopes, eroded.	Severe: depth to rock 20 to 36 inches.	Moderate: depth to rock 20 to 36 inches.	Severe: slope.
GaD	Garmon silt loam, 12 to 20 percent slopes.	Severe: depth to rock 20 to 36 inches; slope.	Moderate: slope; depth to rock 20 to 36 inches.	Severe: slope.
GaE	Garmon silt loam, 20 to 35 percent slopes.	Severe: depth to rock 20 to 36 inches; slope.	Severe: slope.	Severe: slope.
GmE3	Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded.	Severe: depth to rock 20 to 36 inches; slope.	Severe: slope.	Severe: slope.
Gu	Gullied land.	Severe.	Severe.	Severe.
Ha	Hamblen silt loam.	Severe: flooding.	Severe: flooding.	Severe: flooding.
HuB	Humphreys cherty silt loam, 2 to 6 percent slopes.	Slight.	Slight.	Moderate: coarse fragments.
HuC2	Humphreys cherty silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope.	Moderate: slope.	Severe: slope.
Ma	Made land.	([1])	([1])	([1])
Me	Melvin silt loam.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Mf	Morganfield silt loam.	Severe: flooding.	Severe: flooding.	Slight.
MoB	Mountview silt loam, 2 to 6 percent slopes.	Slight.	Slight.	Moderate: slope.
MoC2	Mountview silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope.	Moderate: slope.	Severe: slope.
NdB	Needmore silt loam, 2 to 6 percent slopes.	Severe: moderately slow permeability; depth to rock 24 to 40 inches.	Moderate: depth to rock 24 to 40 inches; shrink-swell potential.	Moderate: slope; moderately slow permeability.
NeC2	Needmore silty clay loam, 6 to 12 percent slopes, eroded.	Severe: moderately slow permeability; depth to rock 24 to 40 inches.	Moderate: depth to rock 24 to 40 inches; shrink-swell potential; slope.	Severe: slope.
NmC3	Needmore silty clay, 6 to 12 percent slopes, severely eroded.	Severe: moderately slow permeability; depth to rock 24 to 40 inches.	Moderate: depth to rock 24 to 40 inches; shrink-swell potential; slope.	Severe: slope; surface soil texture.
Nn	Newark silt loam.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: seasonal high water table.
NoB	Nolichucky fine sandy loam, 2 to 6 percent slopes.	Slight.	Slight.	Moderate: slope.

[1] Onsite investigation required for all uses because soil limitations vary from place to place.

and recreational developments—Continued

Estimated degree of limitation and kind of limitation if limitation is moderate or severe—Continued					
Campsites—Con.	County and access roads	Streets and parking lots in subdivisions	Athletic fields	Play and picnic areas	Lawns, landscaping, and golf fairways
Tent					
Slight	Moderate: depth to rock 20 to 36 inches.	Moderate: depth to rock 20 to 36 inches.	Moderate: depth to rock 20 to 36 inches.	Slight	Moderate: depth to rock 20 to 36 inches.
Moderate: slope	Moderate: depth to rock 20 to 36 inches.	Severe: slope	Severe: slope	Moderate: slope	Moderate: depth to rock 20 to 36 inches.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope; low available moisture capacity.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope; low available moisture capacity.
Severe	Severe	Severe	Severe	Severe	Severe.
Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding; seasonal high water table.	Moderate: flooding.	Moderate: flooding; seasonal high water table.
Moderate: coarse fragments.	Slight	Moderate: slope	Moderate: coarse fragments; slope.	Slight	Slight.
Moderate: coarse fragments; slope.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
(1)	(1)	(1)	(1)	(1)	(1).
Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Slight	Slight	Slight	Slight	Slight	Moderate: flooding.
Slight	Slight	Moderate: slope	Moderate: slope	Slight	Slight.
Moderate: slope	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: moderately slow permeability.	Moderate: shrink-swell potential; depth to rock 24 to 40 inches.	Moderate: slope; shrink-swell potential; depth to rock 24 to 40 inches.	Moderate: slope; moderately slow permeability; depth to rock 24 to 40 inches.	Slight	Moderate: depth to rock 24 to 40 inches.
Moderate: slope; moderately slow permeability.	Moderate: shrink-swell potential; depth to rock 24 to 40 inches; slope.	Severe: slope	Severe: slope	Moderate: slope	Moderate: depth to rock 24 to 40 inches.
Severe: surface soil texture.	Moderate: shrink-swell potential; depth to rock 24 to 40 inches.	Severe: slope	Severe: slope; surface soil texture.	Severe: surface soil texture.	Severe: surface soil texture.
Severe: seasonal high water table.	Severe: flooding	Severe: flooding	Severe: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
Slight	Slight	Moderate: slope	Moderate: slope	Slight	Slight.

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TABLE 7.—*Limitations of soils for nonfarm*

Map symbol	Name of mapping unit	Estimated degree of limitation and kind of limitation if limitation is moderate or severe		
		Septic tank filter fields	Buildings with basements	Campsites: Trailer
NoC2	Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
PbB	Pembroke silt loam, 2 to 6 percent slopes.	Slight	Slight	Moderate: slope
PbC2	Pembroke silt loam, 6 to 12 percent slopes, eroded.	Moderate: slope	Moderate: slope	Severe: slope
PeC3	Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded.	Moderate: slope	Moderate: slope	Severe: slope
Rg	Robinsonville gravelly silt loam	Severe: flooding	Severe: flooding	Severe: flooding
Ro	Rock land	Severe: extremely rocky	Severe: extremely rocky	Severe: extremely rocky
Rs	Roellen silty clay loam	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
SaA	Sango silt loam, 0 to 2 percent slopes.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.
SaB	Sango silt loam, 2 to 6 percent slopes.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.
St	Staser silt loam	Severe: flooding	Severe: flooding	Moderate: flooding
Ta	Taft silt loam	Severe: seasonal high water table; slow permeability; fragipan.	Severe: seasonal high water table; frost action.	Severe: seasonal high water table; slow permeability; fragipan.
TbB2	Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded.	Severe: moderately slow permeability.	Slight	Moderate: slope; moderately slow permeability; coarse fragments.
TbC2	Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded.	Severe: moderately slow permeability.	Moderate: slope; depth to rock 3 to 10 feet.	Severe: slope
TbD2	Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded.	Severe: moderately slow permeability; slope.	Severe: slope	Severe: slope
TcC3	Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded.	Severe: moderately slow permeability.	Moderate: slope; depth to rock 3 to 10 feet.	Severe: slope; surface soil texture.
TlB2	Talbott silty clay loam, 2 to 6 percent slopes, eroded.	Severe: moderately slow permeability.	Slight	Moderate: slope; moderately slow permeability.
TlC2	Talbott silty clay loam, 6 to 12 percent slopes, eroded.	Severe: moderately slow permeability.	Moderate: slope; depth to rock 3 to 10 feet.	Severe: slope
TrB	Tarklin cherty silt loam, 2 to 6 percent slopes.	Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.

and recreational developments—Continued

Estimated degree of limitation and kind of limitation if limitation is moderate or severe—Continued					
Campsites—Con.					
Tent	County and access roads	Streets and parking lots in subdivisions	Athletic fields	Play and picnic areas	Lawns, landscaping, and golf fairways
Moderate: slope	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Slight	Slight	Moderate: slope	Moderate: slope	Slight	Slight.
Moderate: slope	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: slope; surface soil texture.	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope; surface soil texture.	Moderate: slope; surface soil texture.
Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Severe: extremely rocky.	Severe: extremely rocky.	Severe: extremely rocky.	Severe: extremely rocky.	Severe: extremely rocky.	Severe: extremely rocky.
Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: slow permeability; fragipan.	Slight	Moderate: fragipan restricts rooting depth.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Moderate: seasonal high water table; slope.	Severe: slow permeability; fragipan.	Slight	Moderate: fragipan restricts rooting depth.
Moderate: flooding	Slight	Slight	Slight	Slight	Slight.
Severe: seasonal high water table; slow permeability; fragipan.	Moderate: seasonal high water table; frost action.	Moderate: seasonal high water table; frost action.	Severe: seasonal high water table; slow permeability; fragipan.	Moderate: seasonal high water table.	Severe: seasonal high water table; slow permeability; fragipan.
Moderate: moderately slow permeability; coarse fragments.	Slight	Moderate: slope	Moderate: slope; moderately slow permeability; coarse fragments.	Slight	Slight.
Moderate: moderately slow permeability; slope; coarse fragments.	Moderate: depth to rock.	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: surface soil texture.	Moderate: depth to rock.	Severe: slope	Severe: slope; surface soil texture.	Severe: surface soil texture.	Severe: surface soil texture.
Moderate: moderately slow permeability; fragipan.	Slight	Moderate: slope	Moderate: slope; moderately slow permeability; coarse fragments.	Slight	Slight.
Moderate: moderately slow permeability; fragipan; slope.	Moderate: slope; depth to rock.	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe: slow permeability; fragipan.	Moderate: seasonal high water table.	Moderate: seasonal high water table; slope.	Severe: slow permeability; fragipan.	Slight	Slight.

TABLE 7.—*Limitations of soils for nonfarm*

Map symbol	Name of mapping unit	Estimated degree of limitation and kind of limitation if limitation is moderate or severe		
		Septic tank filter fields	Buildings with basements	Campsites: Trailer
TrC	Tarklin cherty silt loam, 6 to 12 percent slopes.	Severe: slow permeability; fragipan.	Moderate: slope; seasonal high water table.	Severe: slow permeability; fragipan; slope.
WrD	Weikert and Ramsey stony soils, 12 to 20 percent slopes.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock.	Severe: shallow depth to rock; slope; coarse fragments.
WrE	Weikert and Ramsey stony soils, 20 to 50 percent slopes.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope; coarse fragments.
WsC	Wellston silt loam, 6 to 12 percent slopes.	Moderate: slope	Moderate: slope	Severe: slope
ZaB	Zanesville silt loam, 2 to 6 percent slopes.	Severe: slow permeability; fragipan.	Slight	Moderate: slow permeability; fragipan.

The ratings for play and picnic areas are based on depth to a seasonal water table, slope, depth to bedrock, surface stoniness, surface rockiness, texture of the surface soil, and flood hazard. These factors are less restrictive for play areas and picnic areas than for athletic fields. These areas are subject to less intensive use than athletic fields.

For lawns, landscaping, and golf fairways, it was assumed that soil materials at the site would be used rather than trucked-in fill or topsoil. The ratings are based on depth to a seasonal water table, slope, depth to bedrock, surface stoniness, surface rockiness, texture of the surface soil, and flood hazard. In the case of a severely eroded soil, they are based, in addition, on the effects of past erosion.

Formation and Classification of the Soils

In this section the five factors of soil formation are discussed. Some effects of these factors on soils in the county are pointed out. Each soil series is classified in the system of soil classification that is used in the National Cooperative Soil Survey. Data are presented that were obtained by analyses of samples from the horizons of a profile of a Crider soil.

Formation of the Soils

Soils are natural bodies that form a nearly continuous cover over the land surface of the earth. Properties of the soil at any place are the combined results of climate and of plant and animal life acting on parent materials. The processes are influenced by relief and time. The five factors just named interact in the formation of a soil.

The relative importance of each of the five soil-forming factors differs from place to place. Some of these factors have affected any one soil more than the other factors. The climate and the kinds of plants and animals are broadly uniform throughout Barren County. There are many local differences within the county, however, in relief, in parent materials of the soils, and in the time that has been available for the formation of the soils.

The interrelationships of the five factors of soil formation are complex. In the paragraphs that follow, each of the factors is discussed separately. In the study of any soil, however, it must be remembered that the effects of any one factor have been influenced by all the other factors.

Climate

Climate affects the physical, chemical, and biological properties of a soil, doing so mostly through the influences of rainfall and temperature.

Climate affects the kinds and amounts of plants and animals that live in an area. It influences the weathering of rocks and minerals and the removal and deposition of materials by water and wind. The temperature influences the rate of chemical processes that are part of weathering and soil formation.

The soils of Barren County were formed in a temperate, moist climate that probably was not greatly different from that of the present time. Winters are fairly short, and there are only short periods when the temperature is extremely low. Summer periods of high temperature are fairly short. The average growing season is 180 days. The average annual precipitation is 49 inches, and precipitation is fairly evenly distributed throughout the year.

The soils are moist much of the time and are subject to leaching. Soluble bases and clay minerals have been moved from the surface soil into the subsoil by water percolating through the soil. Many of the bases were carried through the subsoil, and some of the clay was deposited there. As a result most of the soils are acid and have a clayey subsoil. The Baxter and Cumberland soils are examples.

and recreational developments—Continued

Estimated degree of limitation and kind of limitation if limitation is moderate or severe—Continued					
Campsites—Con.	County and access roads	Streets and parking lots in subdivisions	Athletic fields	Play and picnic areas	Lawns, landscaping, and golf fairways
Tent					
Severe: slow permeability; fragipan.	Moderate: seasonal high water table; slope.	Severe: slope	Severe: slow permeability; fragipan; slope.	Moderate: slope	Moderate: slope.
Severe: shallow depth to rock; slope; coarse fragments.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope; coarse fragments.	Severe: slope; coarse fragments.	Severe: slope; low available moisture capacity; coarse fragments.
Severe: shallow depth to rock; slope; coarse fragments.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope.	Severe: shallow depth to rock; slope; coarse fragments.	Severe: slope; coarse fragments.	Severe: slope; low available moisture capacity; coarse fragments.
Moderate: slope	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: slow permeability; fragipan.	Slight	Moderate: slope	Moderate: slope	Slight	Slight.

Parent materials

The parent materials of the soils in Barren County were of three main kinds: (1) material that weathered in place from rocks similar to those of the present bedrock; (2) alluvium, both general alluvium that was deposited on flood plains by streams and local alluvium that was carried by water and gravity from hillsides and steep slopes and deposited in sinkholes; and (3) a thin to moderately thick mantle of windblown silt, called loess, that was deposited over residuum.

Most of the residual parent materials were derived from limestone of varying degrees of purity, from interbedded calcareous or acid shale and shaly limestone, or from interbedded sandstone and shale. The general alluvium and the local alluvium both consist of materials that were washed mainly from soils underlain by rocks of the kinds just mentioned.

A mantle of material having high content of particles of silt size has influenced many soils of the uplands throughout the county. This mantle ranges up to about 30 inches in thickness. It is believed that the silty material was carried to its present location by wind. The Wellston soils are underlain by siltstone, sandstone, and shale, but they have a high proportion of silt throughout their solum, and it is believed that this silt was carried by the wind. Other soils in the county containing a significant amount of silt that is believed to have been carried by the wind are the Crider, Dickson, Mountview, and Sango soils. Laboratory data for a Crider soil (see table 9) support this belief.

The texture and the chemical and mineral properties of the soils have been greatly influenced by the kinds of parent material. For example, the Talbott soils were formed chiefly in the weathered products of argillaceous limestone. They are much finer in texture than the Bodine soils, which were formed in material derived from very cherty limestone. The Garmon soils were formed in material derived from shaly limestone or from calcareous shale. They have a higher pH value throughout their profile than the Weikert soils, which were formed in parent material derived from acid siltstone, shale, sandstone, and loess. The Cumberland soils, which were formed in material derived from limestone of high purity, contain much more calcium than the Tarklin soils, which were formed in residuum or local or general alluvium derived chiefly from cherty limestone of low purity. The soils that were formed in alluvium, such as the Morganfield and Hamblen soils, have the same general composition as the surrounding soils on uplands from which their parent materials were washed.

Relief

Relief influences formation of soils, chiefly through its effects on drainage and erosion, but also through variations in exposure to climatic forces and the resulting differences in plant cover. Differences in relief affect the amount of moisture within each soil. Water tends to drain away from high places and to accumulate in low places. Slope greatly affects the speed of runoff water and the amount of erosion. The direction of a slope affects the amount of sunlight the soil receives. The amount of sunlight, in turn, affects the temperature of the soil, the type of plant cover, and the amount and kinds of biological activity.

Relief in Barren County has been largely determined by the underlying formations of bedrock and by geologic processes, including the dissection caused by streams. Some areas are highly dissected and have narrow ridgetops and steep side slopes. Others are broad and have undulating to rolling relief. In some areas the surface is one of karst topography and has many sinkholes.

In steep areas a large amount of water runs off the surface and little water percolates through the soil. As a re-

sult, erosion is rapid and soil material is removed almost as rapidly as it is formed. The soils on steep slopes, such as the steep phases of Ramsey and Weikert soils, are shallow to bedrock and have faintly expressed horizons.

In a gently sloping area much of the rainwater enters the soil and percolates downward through it. Only a moderate amount of soil material normally is lost by erosion. As a result, the main soils in such an area are deep and have strongly expressed horizons. The Crider, Pembroke, and Dickson soils are such soils. In some level to gently sloping areas where runoff is slow, percolating water has moved clay and other materials to the lower part of the solum. There, the accumulated materials have become part of a dense, brittle layer that is called a fragipan. The Dickson, Zanesville, and Sango soils are examples of soils that have a fragipan. Soils on flat or concave relief have a fluctuating or seasonal high water table and are likely to be gleyed (dominantly gray) in their subsoil. Examples are the Melvin and the Dowellton soils.

Plant and animal life

Plants and animals supply the organic matter that is in soils. They bring plant nutrients from the lower part of the solum to the upper layers. They produce channels and burrows and help to produce soil structure; thus they aid in the circulation of air and water.

The native vegetation in Barren County was mostly a forest of mixed hardwood trees. According to history, there were fairly large open areas in the northern part, referred to as the barrens, that were covered with strawberry and heather grasses. The soils show little evidence, however, that they were developed under grass vegetation. The Cumberland soils have a dark reddish-brown Ap horizon about 3 to 8 inches thick. This is some evidence that grass influenced their formation. Most of the other soils, such as the Crider, Dickson, Wellston, Clarksville, and Bodine, have the light-colored surface layer that is characteristic of soils formed under trees.

Changes caused by man are most noticeable in the soils that have been eroded, drained, or protected from erosion. Except for such changes, human activity has not yet affected the soils much. Cultivation, fertilization, changes in vegetation, and major landforming operations will change the nature and properties of the soils. Most of the changes, except those due to any major landforming that may be done, will take place slowly.

Time

Time is required for a soil to be formed from parent material. Generally more time is needed for rocks to be weathered than for genetic soil horizons to be formed after loose material from rocks has accumulated. The time needed for a particular soil to be formed depends on the other soil-forming factors.

When soils begin to be formed in loose material, they have characteristics almost identical with those of the parent material. Such soils are said to be immature or youthful. Among the immature soils of Barren County are the Morganfield soils of the flood plains and the Staser soils of the depressions and flood plains along small drainageways. These soils are being formed in fairly recent deposits. They have indistinct soil horizons and little other evidence of soil development.

A soil is generally said to be mature when it has acquired well-developed profile characteristics. Examples of mature soils in Barren County are the Pembroke and Crider soils. These soils are deep. They have distinct horizons, and the soil aggregates in them have a definite arrangement in relation to one another.

Classification of Soils [8]

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationships to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge to specific fields and other tracts.

In classification, soils are placed in narrow classes that are used in detailed soil surveys so that knowledge about the soils can be organized and applied in managing farms, fields, and woodlands; in developing rural areas; in doing engineering work; and in many other activities. They are placed in broad classes of higher categories to facilitate study and comparison in large areas, such as counties, regions, and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*16*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study (*14, 18*). Therefore, readers interested in developments of the system should search the latest available literature on the subject.

Under the current system of classification, soils are placed in classes in each of six categories. Beginning with the broadest and most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. Table 8 gives the family, subgroup, and order under the current classification, and the great soil group under the 1938 classification, for each soil series in Barren County.

Laboratory Data

Analytical data from a profile of Crider soil are given in tables 9 and 10. The profile is number S59Ky-5-2, and it is decribed in the section "Descriptions of the Soils." The analyses were made by the Soil Survey Laboratory, Soil Conservation Service, Beltsville, Md.

All determinations, except those for bulk density and for the moisture retained at tension of one-third atmosphere, were made on the material that passed through a 2-millimeter sieve. Results, except the reaction, are reported on an ovendry basis.

Particle-size distribution was determined by the pipette method after dispersion by sodium hexametaphosphate, and by mechanical shaking (*7, 8*).

Reaction was measured by the glass electrode method, using a suspension having a soil-water ratio of 1:1.

Organic carbon was determined by wet combustion, using a modification of the Walkley-Black method (*11*).

[8] By JOSEPH H. WINSOR, soil correlation specialist, Soil Conservation Service.

TABLE 8.—*Soil series classified according to the current system of classification and the 1938 system with its later revisions*

Series	Current classification			Great soil group of the 1938 classification
	Family	Subgroup	Order	
Baxter	Clayey, mixed, mesic	Typic Paleudults [1]	Ultisols	Red-Yellow Podzolic soils.
Bodine	Loamy-skeletal, siliceous, thermic [2]	Typic Dystrochrepts	Inceptisols	Regosols.
Caneyville	Fine, mixed, mesic	Typic Hapludalfs	Alfisols	Red-Yellow Podzolic soils (intergrading toward Lithosols).
Christian	Clayey, kaolinitic, mesic	Typic Hapludults	Ultisols	Red-Yellow Podzolic soils.
Clarksville	Fine-loamy, siliceous, thermic [3]	Typic Hapludults [3]	Ultisols	Red-Yellow Podzolic soils.
Crider	Fine-silty, mixed, mesic	Ultic Paleudalfs	Alfisols	Red-Yellow Podzolic soils (intergrading toward Reddish-Brown Lateritic soils).
Cumberland	Fine, mixed, thermic [2]	Rhodudultic Paleudults	Ultisols	Reddish-Brown Lateritic soils.
Dickson	Fine-silty, mixed, thermic [2]	Ochreptic Fragiudults	Ultisols	Red-Yellow Podzolic soils that have a fragipan.
Dowellton	Fine, mixed, thermic [2]	Vertic Ochraqualfs	Alfisols	Low-Humic Gley soils (intergrading toward argipan Planosols).
Fredonia	Clayey, mixed, thermic [3]	Typic Rhodudults [3]	Ultisols	Reddish-Brown Lateritic soils.
Garmon	Fine-loamy, mixed, mesic	Typic Dystrochrepts	Inceptisols	Sols Bruns Acides.
Hamblen [4]	Fine-loamy, mixed, thermic [2], [5]	Aquic Fluventic Dystrochrepts.[5]	Inceptisols	Alluvial soils.
Humphreys	Fine-loamy, siliceous, thermic [2]	Humic Hapludults	Ultisols	Red-Yellow Podzolic soils.
Melvin	Fine-silty, mixed, nonacid, mesic	Fluventic Haplaquepts	Inceptisols	Low-Humic Gley soils.
Morganfield	Coarse-silty, mixed, nonacid, thermic.[2]	Typic Udifluvents	Entisols	Alluvial soils.
Mountview	Fine-silty, siliceous, thermic [2]	Typic Paleudults [1]	Ultisols	Red-Yellow Podzolic soils.
Needmore	Fine, mixed, mesic	Ultic Hapludalfs	Alfisols	Red-Yellow Podzolic soils.
Newark	Fine-silty, mixed, nonacid, mesic	Aeric Fluventic Haplaquepts	Inceptisols	Alluvial soils (intergrading toward Low-Humic Gley soils).
Nolichucky	Fine-loamy, siliceous, mesic	Typic Paleudults	Ultisols	Red-Yellow Podzolic soils.
Pembroke	Fine-silty, mixed, mesic	Ultic Paleudalfs	Alfisols	Red-Yellow Podzolic soils (intergrading toward Reddish-Brown Lateritic soils).
Ramsey	Loamy, siliceous, thermic [2]	Lithic Dystrochrepts	Inceptisols	Lithosols (intergrading toward Sols Bruns Acides).
Robinsonville	Coarse-loamy, mixed, nonacid, thermic.[2]	Typic Udifluvents	Entisols	Alluvial soils.
Roellen	Fine, montmorillonitic, noncalcareous, thermic.[2]	Vertic Haplaquolls	Mollisols	Humic Gley soils.
Sango	Coarse-silty, siliceous, thermic [2]	Ochreptic Fragiudults	Ultisols	Red-Yellow Podzolic soils that have a fragipan.
Staser	Fine-loamy, mixed, thermic [2]	Fluventic Hapludolls	Mollisols	Alluvial soils.
Taft	Fine-silty, siliceous, thermic [2]	Aqueptic Fragiudults	Ultisols	Planosols that have a fragipan.
Talbott	Fine, mixed, thermic [2]	Typic Hapludalfs	Alfisols	Red-Yellow Podzolic soils.
Tarklin	Fine-loamy, siliceous, mesic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils that have a fragipan.
Weikert	Loamy-skeletal, mixed, mesic	Lithic Dystrochrepts	Inceptisols	Lithosols (intergrading toward Sols Bruns Acides).
Wellston	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols	Gray-Brown Podzolic soils (intergrading toward Red-Yellow Podzolic soils).
Zanesville	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils that have a fragipan.

[1] These soils in Barren County have shallower argillic horizons than typifying for the respective soil series.
[2] Barren County is located in the mesic soil temperature zone but is believed to be close enough for less than 2° F. soil temperature difference from mesic-thermic boundary line.
[3] Classification tentative.
[4] The Hamblen series had inactive status when this survey was sent to the printer.
[5] Hamblen soils in Barren County are less acid and are estimated to have base saturation more than 60 percent.

One milliequivalent of $K_2Cr_2O_7$ is equivalent to 3.9 milligrams of carbon.

Total nitrogen was determined by a semimicro modification of the Kjeldahl method. Digestion was done in a mixture of potassium sulfate and concentrated sulfuric acid, using selenium metal and copper sulfate as catalysts. The ammonia distillate was collected in boric acid and titrated with sulfuric acid.

Extractable cations were displaced with normal ammonium acetate at pH 7. Calcium was determined by precipitation of the oxalate and titration with cerate (*11*). Magnesium was precipitated as magnesium ammonium

TABLE 9.—*Chemical and physical*

[Analyses by Soil Survey Laboratory, Soil Conservation Service, Beltsville, Md.

Laboratory number	Horizon	Depth	Particle-size distribution									Coarse fragments, greater than 2 mm.
			Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than 0.002 mm.)	International silt		
										II (0.2 to 0.02 mm.)	III (0.02 to 0.002 mm.)	
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
59381	Ap	0–7	0.7	0.9	0.8	5.1	6.2	70.6	15.7	34.3	46.4	<1
59382	B1	7–11	.5	.7	.8	3.9	4.7	66.3	23.1	28.3	45.5	0
59383	B21t	11–18	.6	.7	.7	4.5	5.4	63.4	24.7	28.2	43.9	<1
59384	B22t	18–23	.6	.9	.8	5.9	7.0	60.3	24.5	30.3	41.3	2
59385	B23t	23–27	.8	.8	.7	6.3	8.9	58.9	23.6	32.6	39.9	3
59386	IIB24t	27–30	1.5	.9	.7	6.4	8.7	55.0	26.8	30.6	38.0	4
59387	IIIB25t	30–39	.9	.5	.6	6.2	8.6	46.8	36.4	28.8	31.3	1
59388	IIIB26t	39–51	.4	.5	.8	9.9	13.2	25.1	50.1	29.8	16.0	<1
59389	IIIB27t	51–63	.2	.7	1.1	14.5	19.0	24.5	40.0	40.2	14.2	<1
59390	IIIB3t	63–71	.6	.7	1.1	14.5	19.4	24.5	39.2	40.3	14.4	<1
59391	IIIC	71–78	.4	.6	1.0	14.3	18.8	25.0	39.9	39.4	15.1	<1

[1] Crider silt loam, S59Ky–5–2: 4 miles NW. of Glasgow city limits on Ky. Highway No. 90 and one-half mile E. on gravel road.

phosphate and determined by neutralization (*11*). Sodium and potassium were determined by flame spectrophotometry. Exchangeable hydrogen was determined by neutralizing an extract made by leaching a column of soil with a barium chloride-triethanolamine solution having a reaction of pH 8.2. Cation-exchange capacity is the sum of the extractable bases and the exchangeable hydrogen, all expressed as milliequivalents per 100 grams of soil.

Free iron oxides were extracted with sodium hydrosulfite and titrated with dichromate (*9*).

To measure bulk density and moisture retained at one-third atmosphere tension, intact clods were coated in the field with Dow Saran resin 220 and were given additional coatings in the laboratory. Clods were cut in two, placed so that the cut surface was in contact with a ceramic tension plate, saturated with water, and desorbed under tension of one-third atmosphere. After equilibrium was reached, the cut surface was coated with plastic, and the volume and moisture content of the soil were measured. Bulk density is reported for the soil at its moisture content under tension of one-third atmosphere and also at the ovendry state.

The moisture held at a tension of 15 atmospheres was determined on the soil that passed through a sieve having openings 2 millimeters in diameter (*12*).

TABLE 10.—*Clay mineralogy, and partial chemical composition of silt fractions of a Crider soil* [1]

[Analyses by Soil Survey Laboratory, Soil Conservation Service, Beltsville, Md. Absence of data indicates values were not determined]

Laboratory number	Horizon	Depth	Clay minerals [2]				Composition of silt fractions							
			Vermiculite (X-ray)	Mica (X-ray)	Quartz (X-ray)	Kaolinite (D.T.A.)	ZrO_2		K_2O		CaO		TiO_2	
							50–20 microns	20–2 microns	50–20 microns	20–2 microns	50–20 microns	20–2 microns	50–20 microns	20–2 microns
		Inches				*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
59381	Ap	0–7	xx	T	xx	10	0.17	0.08	0.83	1.2	0.11	0.11	0.59	1.0
59382	B1	7–11	xx	x	xx	13	.17	.07	.89	1.3	.11	-------	.57	.9
59383	B21t	11–18	xx	T	xx	10	.18	.07	.93	1.3	.11	-------	.53	1.0
59384	B22t	18–23	xx	T	xx	15	.16	.08	.81	1.1	.11	.10	.57	1.0
59387	IIIB25t	30–39	xx	Nd	x	38	.15	.10	.34	.51	.07	-------	.54	1.1
59389	IIIB27t	51–63	x	T	Nd	30	.23	.15	.04	.08	.09	.07	.50	1.5

[1] Crider silt loam, S59Ky–5–2: 4 miles NW. of Glasgow city limits on Ky. Highway No. 90 and one-half mile E. on gravel road.
[2] Nd=not detected; T=trace; x=small; xx=moderate.

characteristics of a Crider soil [1]

See text for methods of analysis. Absence of data indicates value was not determined]

Textural class	Reaction	Organic carbon	Total nitrogen	C/N ratio	Free iron oxide (Fe_2O_3)	Cation-exchange capacity (sum)	Extractable cations (milliequivalents per 100 grams of soil)					Base saturation (sum)	Bulk density, ⅓ atmosphere	Bulk density, oven-dry	Moisture retained at—	
							Ca	Mg	Na	K	H				⅓ atmosphere (clods)	15 atmospheres (fragments)
	pH	*Percent*	*Percent*		*Percent*	*Meq./100 gm.*						*Percent*	*Gm./cc.*	*Gm./cc.*	*Percent*	*Percent*
Silt loam	5. 1	0. 77	0. 092	8	1. 5	9. 1	2. 3	0. 5	0. 03	0. 25	6. 0	34	1. 48	1. 52	18. 7	6. 1
Silt loam	4. 9	. 29			2. 1	10. 4	3. 6	. 8	. 05	. 22	5. 7	45	1. 34	1. 40	19. 3	8. 3
Silt loam	4. 8	. 23			2. 6	11. 9	4. 0	1. 0	. 05	. 22	6. 6	44	1. 38	1. 43	24. 0	9. 6
Silt loam	4. 9	. 12			2. 6	12. 2	4. 7	1. 3	. 06	. 23	5. 9	52	1. 47	1. 55	22. 8	9. 4
Silt loam	4. 8	. 06			2. 4	10. 9	4. 0	1. 2	. 07	. 19	5. 4	50	1. 56	1. 62	21. 1	8. 9
Silt loam to silty clay loam.	4. 8	. 06			3. 0	10. 9	3. 8	1. 0	. 07	. 19	5. 8	47	1. 46	1. 53	21. 7	9. 1
Silty clay loam	4. 7	. 06			4. 0	13. 2	4. 8	1. 0	. 09	. 25	7. 1	46	1. 47	1. 55	25. 5	12. 2
Clay	4. 9	. 04			5. 7	15. 6	5. 8	1. 0	. 07	. 24	8. 5	46	1. 52	1. 62	25. 5	18. 2
Clay loam to clay.	4. 8	. 04			5. 0	10. 8	4. 0	. 7	. 06	. 25	5. 8	46	1. 58	1. 64	22. 9	14. 7
Clay loam to clay.	4. 8	. 02			4. 5	10. 3	4. 0	. 7	. 07	. 17	5. 4	47	1. 57	1. 63	23. 4	14. 3
Clay loam to clay.	5. 0	. 04			4. 9	10. 8	4. 0	. 7	. 06	. 16	5. 9	45	1. 50	1. 62	26. 1	15. 2

Clay mineralogy by X-ray diffraction was determined by use of a Norelco diffractometer, FeK_α radiation, scanning speed 1 degree per minute; oriented samples on glass slides; magnesium-saturated samples with and without solvation with ethylene glycol; and potassium-saturated samples at room temperature and after heating to 110° C., to 250° C., and to 500° C. Differential thermal analysis was made by means of the apparatus described by Hendricks and Alexander (*6*).

In the X-ray spectrochemical analysis reported in table 10, total potassium, calcium, titanium, and zirconium were determined by using powder specimens of silt of the 20- to 50-micron fraction and of the 2- to 20-micron fraction. The analysis was made using a Norelco instrument with a lithium fluoride analyzing crystal. Bureau of Standards reference samples were used as standards. Interference from strontium in the determinations of zirconium was corrected by measurements of the intensity of the strontium K line.

General Nature of the Area

This section gives information about the history, topography, drainage, and geology of Barren County. It also gives facts about the agriculture, industry, natural resources, cultural facilities, and climate.

History of the County

Perhaps the first white men to spend an appreciable amount of time in Barren County were the "long hunters" who camped on Beaver Creek in 1769 to trap. This party was led by the wilderness guide, Henry Skaggs, who located his camp about 2 miles north of Glasgow. The practice of such parties of spending considerable periods of time, away from their homes, trapping, hunting, and exploring gave rise to the term "long hunters."

The name of Barren County, as well as the names of the Little and Big Barren Rivers, was derived from the term applied to treeless plains. These have been commonly known in southern Kentucky as the barrens and, more recently, are referred to as the karst area.

The Virginia Convention, in 1789, passed an order declaring that all the lands between the Green and Barren Rivers would be given to soldiers of the Continental Army. Many of these men were among the first settlers in the area.

In 1798 Barren County was formed from Warren and Green Counties and was the 37th county created in the State. Originally, its boundaries stretched from the Green River to the Big Barren River and the county included all of Metcalfe County, large parts of Hart and Monroe Counties, and part of Allen County. The county seat of Glasgow was established in 1799.

Industrial life flourished in Barren County almost as soon as the county was formed. Taverns and shops, hastily constructed of logs, sprung up almost overnight. By 1806, business houses were so much in demand that incoming merchants, their stocks of goods often brought from Philadelphia, were obliged to crowd their goods into shacks until they could construct their own buildings. The milling business boomed on every creek. Cotton gins were scattered over the county, and carding factories flourished in Glasgow. Many workers of diverse industrial skills moved to the county before 1810.

The War of 1812 gave new impetus to development of the county. The county abounded in caves in which saltpeter was found, and powdermills were erected. Every large creek had its sawmills and gristmills. Trading of

produce from the vast back country for manufactured products was immense.

Among the first agricultural experiments in the county was the tending of vineyards, started by a Swiss. There was much demand for the products, but the vineyards were sold to inexperienced parties. Then, they were neglected and this venture died out. Other crops that were tried, with mediocre success, were ginseng, cotton, and flax. Tobacco growing was begun in 1812, and tobacco became one of the county's chief crops.

Efforts to build a branch railroad in the county started immediately after the Civil War. Once it was built, the branch made possible better and cheaper transportation of products and better marketing conditions. Oil was discovered in the county in the 1840's and has continued to be a steady source of income.

Topography, Drainage, and Geology

Barren County lies in the eastern and western Pennyroyal physiographic regions of Kentucky, which are parts of the Mississippian Plateau (*10*). The topography of the county is predominantly that of a dissected plateau, particularly in the central and southern parts, and varies greatly. The central and southern areas are composed of deep, narrow valleys that have moderately steep to steep sidewalls and of moderately broad to narrow ridges. The northern part of the county is rolling and has karst topography. The county is traversed from the northeast to the southwest by Beaver Creek and its tributaries. The Barren River and its reservoir form the southwestern boundary.

The topography of the county ranges from slightly depressed to steep, being closely related to geologic formations and kinds of soil. The highest point in the county is 1,058 feet high and is located on Prewitts Knob, about 3 miles south of Cave City. The highest point within the limits of Glasgow, the county seat, is a point about 840 feet above sea level, located west of the Glasgow cemetery.

With the exception of Beaver Creek and the Barren River, the principal streams in the county are deeply entrenched and flow in relatively narrow valleys. A rolling section of considerable acreage extends across the northern part of the county. Broad, gently sloping interstream areas are common between sinkholes and depressions.

The most highly dissected areas are in the southern part of the county. In those areas the ridges rise from an elevation of 480 feet to 920 feet. The lowest elevation is south of Finney on the Barren River flood plain. The highest part of this dissected area is located southeast of Tracy near the Monroe County line, about 1 mile east of Union Church.

Surface drainage is predominant in approximately 60 percent of the county. Subterranean drainage is predominant in areas of karst topography.

The channel of the Barren River, which forms the boundary line between Barren and Allen Counties, is the base of the Barren River Reservoir, which covers approximately 10,000 acres at seasonal pool level of 552 feet above sea level. This reservoir drains approximately 60 percent of the land area of Barren County. The water from all major streams in the county flows into the reservoir.

Streams in the county that drain a considerable acreage and are either tributaries of, or find their way into, the Barren River Reservoir are Beaver Creek, Skaggs Creek, Peter Creek, Falling Timber Creek, Glover Creek, Boyds Creek, Nobob Creek, South Fork of Beaver Creek, Rose Creek, Coon Creek, and Caney Fork.

The channel of Beaver Creek, which meanders across the county, has been allowed to silt in behind obstructions of many types. The channel has been reduced in capacity and will no longer carry the runoff water from heavy rains. Only a small rise in the creek level is needed to spread water over the flood plains. The floodwaters deposit undesirable gravel bars and leave sloughs and low areas of standing water. A considerable acreage of wet soils is on the low-lying plains of Beaver Creek.

In karst areas the depressions and sinks are drained by natural outlets or connecting underground tunnels. The drainage water flows to surface streams at lower elevations. The natural outlets, commonly called sinkholes, range from about 10 to as much as 50 feet in diameter. Occasionally, they become clogged with crop residue, debris, and sediment that has been deposited by runoff. When they are clogged, water stands in the depressions for considerable periods before it filters down into the underground streams, and these depressions, consequently, are unsuitable for cultivated crops. If its outlet is sealed tightly enough, a depression becomes filled with water permanently and can be used as a stockwater pond.

Barren County is underlain by sedimentary rocks of the Mississippian and Devonian periods, but the rocks (*10*) are predominantly of Mississippian age. In the most deeply entrenched channels, minor exposures of Chattanooga shale of the Devonian period occur, but these exposures have had little or no influence on the parent materials of the soils.

Resting upon the Chattanooga shale is the Fort Payne formation of Mississippian age. This formation consists of cherty limestone, siltstone, shale, and sandstone. It ranges from about 100 to 200 feet in thickness. Limestone, thinly bedded siltstone, and shale of the Salem and Warsaw formations are above the Fort Payne formation. These formations are 150 feet thick in places. They normally occur together, either interfingered or mixed, but the Salem formation is absent in some areas.

Cherty limestone of the St. Louis formation is on the higher ridgetops and is most extensive in the northern part of the county. The thickness of this formation ranges from about 60 feet in the south to 290 feet in the north. Ste. Genevieve limestone is above the St. Louis formation in the vicinity of Park City and is approximately 180 feet thick. Argillaceous limestone of the Girkin formation is immediately above the Ste. Genevieve limestone at the base of the Knobs and is 100 feet thick in places. Resting on the Girkin formation in the vicinity of Mammoth Cave is the Big Clifty sandstone, which is approximately 85 feet thick.

A mantle of wind-deposited silt, or loess, that ranges from practically none up to 30 inches in thickness covers many of the gently rolling to level ridgetops throughout the county.

Further information on the geology of the county is given in the section "Formation and Classification of the Soils."

Agriculture

Agriculture is a main source of income in Barren County, employing about 5,200 persons, but the proportion of the county in farms and the average size of the farms have decreased since 1959. In 1966 the farm population was estimated by the University of Kentucky Agricultural Extension Service to be 29,500, an increase of 1,039 over the 1950 census figure. One or more members of the families on about 50 percent of the farms in the county work off the farms for added income. According to the U.S. Census of Agriculture, the average size of the farms in the county was 81.6 acres in 1964, or 6.6 acres less than in 1959. There is considerable variation in the size of the farms. They range from less than 10 acres to more than 1,000 acres in size.

In 1964, 87.2 percent of the land area, or 271,380 acres, was in farms. About 22,300 fewer acres were in farms than in 1959. Land in farms was distributed as follows in 1964:

	Acres
Cropland harvested	72, 679
Cropland used only for pasture	114, 515
Cropland not harvested and not pastured	19, 286
Woodland not pastured	19, 137
Woodland pastured	18, 882
Other pasture (not cropland and not woodland)	11, 649

Hay and small grains for forage are the most important feed crops grown on the farms, and tobacco is the most important cash crop. These crops are grown on most farms. Small grains and hay, mainly lespedeza, mixed grasses, alfalfa, and clover, are the main forage crops. In 1964 the acreage of alfalfa and alfalfa mixtures was 8,983 acres, or 2,608 acres more than in 1959. Small grains are grown for feed on many farms, but the acreage is small.

In 1965 about 47 percent of the total farm income of the county was from burley tobacco; 25 percent, from milk and other dairy products; 15 percent, from beef; 4 percent, from swine; 3 percent, from poultry; and 6 percent, from other farm products, including hay, grain, timber, strawberries and other fruits, and greenhouse products.

As advances are made in the science of agriculture, farmers in Barren County are becoming more and more conscious of soil and water conservation and are using grasses and legumes instead of row crops on soils that are steep, wet, or low in inherent fertility. This change, motivated by low crop yields on eroded, wet, or droughty soils, is bringing about increases in dairying and beef cattle raising as major sources of farm income.

Industry and Natural Resources

Industry has been expanding in Barren County. In 1963 there were 23 manufacturing establishments and they had an annual average of 1,196 employees, according to the 1963 U.S. Census of Manufacturers. In 1963 the number of employees in manufacturing was 224 more than in 1958.

The most important natural resources of the county are soil, water, oil, and limestone. All of Glasgow and most of Barren County are well supplied by water from streams, springs, ponds, and wells. It is estimated that oil production in the county has decreased in recent years. Great quantities of limestone are available for use in roadway construction, local building, and farming.

Cultural Facilities

Cultural facilities in Barren County have grown to accommodate the needs of the expanding population and contribute to the needs of people in adjoining counties. The county maintains 5 high schools and 10 elementary schools. Glasgow has a vocational trade school that is an extension of Western Trade School of Bowling Green, Ky. The county is served by one daily newspaper, one weekly newspaper, and two radio stations. There are many churches.

Glasgow is served by a railroad and has a municipal airport that has a 3,000-foot paved runway. Seven highways lead to Glasgow, and Interstate Highway No. 65 is about 14 miles directly northwest of the city. Only a few areas in the county are not accessible by good roads throughout the year.

Glasgow has a municipally owned distribution system for electricity, which is generated by the Tennessee Valley Authority. The Farmers Rural Electric Co-operative Corporation also distributes electricity in the county. Glasgow has piped gas and is served by a large telephone system.

Climate [9, 10]

The climate of Barren County is temperate, and there is a wide range of temperature between winters and summers. Although, on the average, October is the driest month, precipitation is relatively well distributed throughout the year; there is no wet season and no dry season. Temperature, rainfall, and humidity remain within limits suited to varied plant and animal life.

Barren County, like other Kentucky counties, experiences a wide range of temperature throughout the year, as is illustrated by data in columns 4 and 5 of table 11. These columns, which show the probability of very high and very low temperatures, indicate that an average of 2 years in 10 will have at least 4 days in July when the temperature reaches 99° F. or higher and at least 4 days in January when the temperature falls to 7° or lower. In neither case are the 4 days necessarily consecutive.

The nighttime temperature drops to freezing (32° F.) or below about 96 days during the average year. Since the mercury rises to above freezing on all but about 12 of these days, a daily freeze-thaw cycle is normal. A temperature of zero or below occurs, on an average, 1 day per winter.

In Barren County the average length of the growing season, from the last freezing temperature in spring to the first in fall, is about 180 days. Table 12 gives the probability of freezing temperatures occurring after specified dates in spring and before specified dates in fall. Critical temperatures differ for different crops, and the table gives probabilities for five temperature thresholds.

Annual precipitation in the county averages about 49 inches, which is sufficient for the production of a number

[9] This section was written by A. B. ELAM, JR., State climatologist, U.S. Weather Bureau, Lexington, Ky.

[10] Because of the sparsity of weather data for Barren County, most of the statements in this summary and many of the data in the tables are based on data for other places, principally Greensburg, Ky., about 29 miles northeast of Glasgow.

TABLE 11.—*Temperature and precipitation*

Month	Temperature				Precipitation				
	Average daily maximum [1]	Average daily minimum [1]	Two years in 10 will have at least 4 days with—		Average total [1]	One year in 10 will have—		Days with snow [2]	Average depth of snow on days with snow cover [2]
			Maximum temperature equal to or higher than [2]—	Minimum temperature equal to or lower than [2]—		Less than [2]—	More than [2]—		
	°F.	°F.	°F.	°F.	Inches	Inches	Inches	Number	Inches
January	48	30	67	7	5.9	1.8	10.9	4	2
February	51	31	68	11	4.2	1.3	8.2	3	3
March	59	37	77	19	5.4	2.7	8.4	1	5
April	70	46	85	30	4.1	2.1	6.0	0	0
May	78	54	90	39	4.1	1.8	7.3	0	0
June	86	63	97	51	4.5	1.5	7.8	0	0
July	89	66	99	55	3.9	2.0	7.4	0	0
August	88	65	97	52	3.4	1.7	6.0	0	0
September	82	58	95	43	3.1	1.0	6.0	0	0
October	72	46	86	30	2.4	1.0	4.1	0	0
November	58	36	75	19	3.8	1.4	7.3	1	2
December	49	31	64	12	4.4	1.8	7.2	2	2
Year	69	47	[3] 100	[4] −1	49.2	38.2	58.5	11	3

[1] Estimates, 1953–60 Glasgow data adjusted to 1931–60 period.
[2] Estimates based on climatology of Greensburg, Ky.
[3] Average annual highest maximum.
[4] Average annual lowest minimum.

of crops. Column 6 of table 11 gives monthly averages of precipitation. Measurable precipitation occurs about 120 days during the average year. In some years precipitation is either inadequate or excessive. Columns 7 and 8 of table 11 show the probability of getting very high and very low amounts of precipitation. These columns indicate that an average of about 1 year in 10 will have less than 1.5 inches of rainfall in June and about 1 year in 10 will have more than 10.9 inches of precipitation in January.

Thunderstorms occur, on an average, 50 days per year. They are most frequent in spring and summer but may occur in any month. Thunderstorms will cause most of the high-intensity rainfall of short duration that is likely to occur during summer. In almost every year the greatest 1-hour rainfall will be 1.2 or more inches. There is a 30 percent chance that such a rainfall will occur in July of any year and a chance of less than 1 percent that such a rainfall will occur from December through February. About once in 10 years, a 24-hour total of 4.7 or more inches of rainfall can be expected. The chance of such rainfall is about 3 percent in any July and less than this in any other month. Lower intensity rainfall that lasts several days sometimes occurs late in spring and delays tillage. Long periods of mild, sunny weather are typical in fall, when they are needed to permit completion of harvesting.

Although the average annual snowfall at Glasgow for the period 1953 to 1964 was 13.9 inches, other climatological data for the area indicate that there are only about 11 days a year that have snowfall of 1 inch or more. Snowfall is quite variable from year to year, and in some winters there is little or none. The maximum total snowfall in a month recorded during the period 1953 to 1964 was 30.0 inches, in March 1960.

Records on wind, sunshine, and relative humidity are not available for Barren County, but it is possible to make estimates based on climatological data for the area. Winds

TABLE 12.—*Probabilities of last freezing temperatures in spring and first in fall* [1]

Probability	Dates for given probability and temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than	March 23	March 29	April 10	May 2	May 7
2 years in 10 later than	March 15	March 23	April 5	April 27	May 2
5 years in 10 later than	March 1	March 10	March 23	April 15	April 22
Fall:					
1 year in 10 earlier than	November 14	November 1	October 21	October 13	October 1
2 years in 10 earlier than	November 20	November 7	October 26	October 18	October 6
5 years in 10 earlier than	November 29	November 17	November 6	October 27	October 16

[1] Estimates based on climatology of Greensburg, in Green County, Ky.

blow most frequently from the south to southwest. Wind speed is lowest in the months June through October, the monthly averages varying from 6 to 8 miles per hour. It is highest in the months November through May, the monthly averages ranging from 9 to 11 miles per hour.

Rises and falls of relative humidity are opposite to those of temperature during the typical day, the highest humidity usually occurring with the minimum temperature of the day and the lowest humidity usually occurring with the highest temperature. Humidity readings in the midseason months at 7 a.m. and 1 p.m. average about 80 percent and 70 percent, respectively, for January, 75 percent and 53 percent for April, 79 percent and 53 percent for July, and 83 percent and 52 percent for October. The percentage of possible sunshine in the mid-season months averages about 41 percent for January, 58 percent for April, 70 percent for July, and 64 percent for October.

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Glossary

Acid soil. See Reaction, soil.

Aggregate, soil. Many fine particles held together in a single mass or cluster, such as a clod, crumb, block, or prism.

Alkaline soil. See Reaction, soil.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Argillaceous material. A material of, or containing, clay.

Associated soils. Soils closely located geographically in the landscape to a given soil.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available moisture capacity. The capacity of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. Lowland formed by alluvial deposits along a stream; a flood plain.

Calcareous soil. A soil containing enough calcium carbonate to effervesce (fizz) when treated with cold, dilute hydrochloric acid.

Chroma. See Color, Munsell notation.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A coating of oriented clay particles that are commonly on the surfaces of peds and pores. The orientation of the clay is parallel to the ped surfaces, and in thin sections an abrupt boundary separates it from the unoriented matrix. Under a hand lens, the clay film appears to be smooth and wavy.

Color, Munsell notation. A system for designating color by degrees of three simple variables—hue, value, and chroma. For example, the notation 10YR 6/4 represents a color that has a hue of 10YR, a value of 6, and a chroma of 4. Hue is the dominant spectral color; value relates to the relative lightness of color; chroma is the relative purity or strength of color and increases as grayness decreases.

Concretions. Hard grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds that cement the soil grains together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of slope or are parallel to the terrace grade.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.

Depth, soil. In this survey soil depth refers to the depth from the surface of the soil to bedrock or other nonsoil material. The depth classes are (1) *deep*, more than 36 inches; (2) *moderately deep*, 20 to 36 inches; (3) *shallow*, 10 to 20 inches; (4) *very shallow*, less than 10 inches.

Drainage, soil. (1) The removal of excess surface or ground water from a soil by means of surface or subsurface drains. (2) The relative rapidity and extent of removal of water from on and within the soil under natural conditions. Terms commonly used to describe drainage classes of soils are as follows:

Very poorly drained.—Water is removed so slowly that the soil remains wet most of the time and water ponds on the surface frequently.

Poorly drained.—Water is removed so slowly that the soil is wet for a large part of the time.

Somewhat poorly drained.—Water is removed slowly enough to keep the soil wet for significant periods but not all of the time.

Moderately well drained.—Water is removed from the soil somewhat slowly so that the profile is wet for a small but significant part of the time.

Well drained.—Water is removed from the soil readily but not rapidly.

Excessively drained.—Water is rapidly removed from the soil.

Erosion. The wearing away of the land surface by the action of wind or water.

Flood plain. A nearly level area, subject to overflow unless it is protected, that occurs along a stream.

Fragipan. A dense, brittle, subsurface horizon that is very low in content of organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons that have yellow and gray mottling caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes.

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active, and it is therefore marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has (1) distinctive characteristics caused by accumulation of clay, sesquioxides, humus, or some combination of these; (2) prismatic or blocky structure; (3) redder or stronger colors than the A horizon; or (4) some combination of these. The combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed in most soils. If the underlying material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Hue. See Color, Munsell notation.

Inclusion. A kind of soil that has been included in mapping a soil of a different kind because the area was too small to be mapped separately on a map of the scale used.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Karst area. A limestone area that is marked by sinks and is interspersed with abrupt ridges, irregular, protuberant rocks, caverns, and underground streams.

Loam. A textural class for soils. Loam contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Loess. A fine-grained soil material that accumulated through wind action and consists dominantly of silt-sized particles.

Mapping unit, soil. An area of a soil, miscellaneous land type, soil complex, undifferentiated soil group, or soil association that is enclosed by a boundary on a soil map and identified by a symbol.

Moisture-supplying capacity. See Available moisture capacity.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell color notation. See Color, Munsell notation.

Parent material. The distintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are (1) *slow*, less than 0.2 inch per hour; (2) *moderately slow*, 0.2 to 0.63 inch per hour; (3) *moderate*, 0.63 to 2.0 inches per hour; (4) *moderately rapid*, 2.0 to 6.3 inches per hour; and (5) *rapid*, more than 6.3 inches per hour.

pH. See Reaction, soil.

Profile, soil. A vertical section of soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction; it is neither acid nor alkaline. In words the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but, in many places, is the material in which a soil has formed.

Runoff. Rainwater that flows over the surface of the soil without sinking in.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower

limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slope. Among the characteristics of a soil are the length, shape, pattern, and degree of its incline, or slope. In this survey the slope classes are as follows: 0 to 2 percent, level; 2 to 6 percent, gently sloping; 6 to 12 percent, sloping; 12 to 20 percent, strongly sloping; 20 to 30 percent, moderately steep; 30 to 50 percent, steep; and more than 50 percent, very steep.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stratified. Composed of, or arranged in, strata, or layers, such as stratified alluvium. The term is confined to geological material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands to serve as a vegetative barrier to wind and water erosion. Stripcropping is commonly practiced as a part of contour farming. See also Contour farming.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer lying beneath the solum, or true soil; the C or R horizon.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 10 inches in thickness. The plowed layer.

Terrace. (1) A nearly level or undulating plain, commonly rather long and narrow and having a steep front that faces a river bottom. (2) An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surplus runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." See also Clay; Loam; Sand; and Silt.

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland. Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Value. See Color, Munsell notation.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone. In this survey the term *seasonal water table* refers to saturation during rainy periods.

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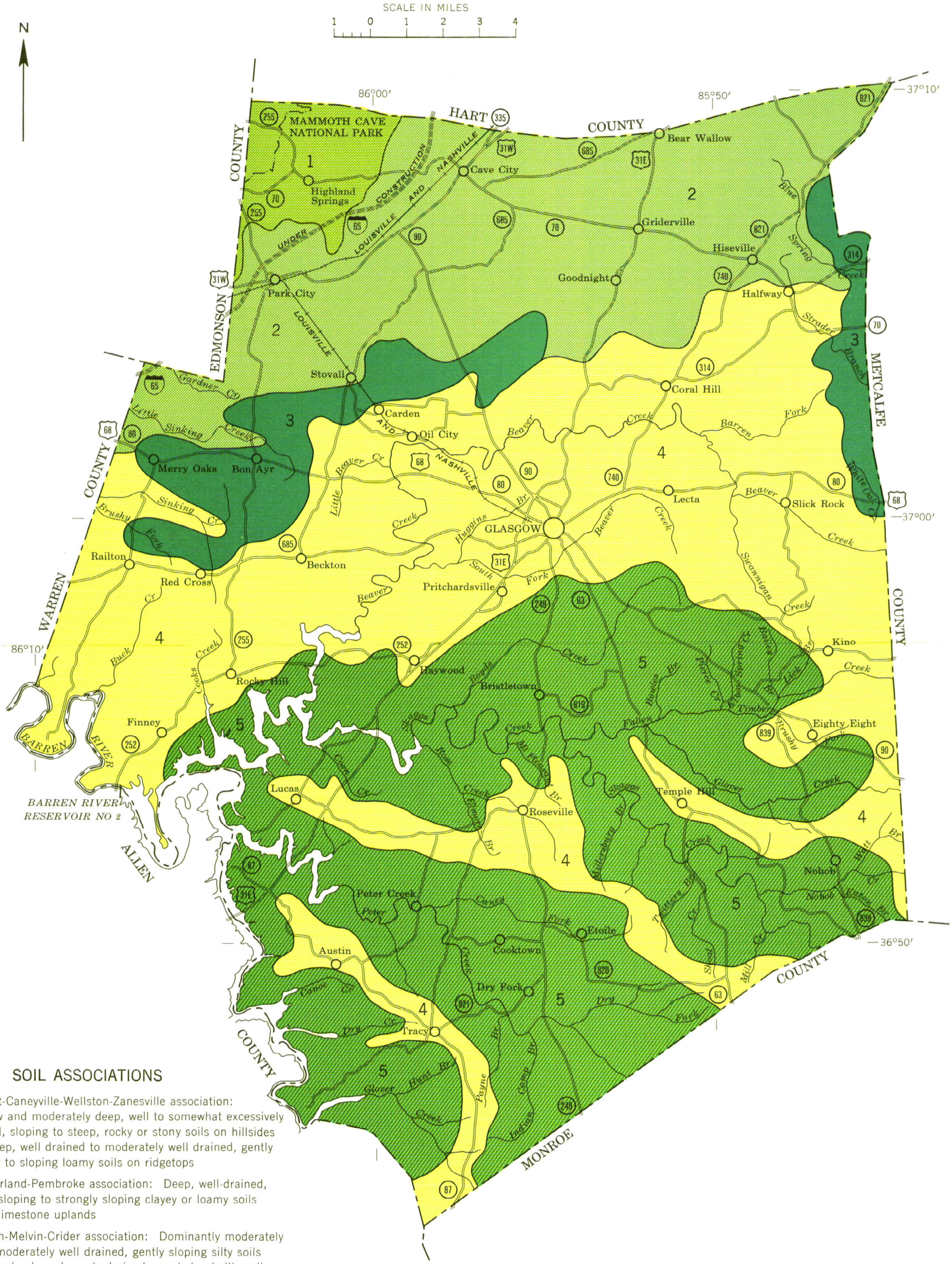
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

KENTUCKY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
BARREN COUNTY, KENTUCKY



SOIL ASSOCIATIONS

1 — Weikert-Caneyville-Wellston-Zanesville association: Shallow and moderately deep, well to somewhat excessively drained, sloping to steep, rocky or stony soils on hillsides and deep, well drained to moderately well drained, gently sloping to sloping loamy soils on ridgetops

2 — Cumberland-Pembroke association: Deep, well-drained, gently sloping to strongly sloping clayey or loamy soils of the limestone uplands

3 — Dickson-Melvin-Crider association: Dominantly moderately deep, moderately well drained, gently sloping silty soils of the uplands and poorly drained, nearly level silty soils on flood plains

4 — Baxter-Talbott-Dickson association: Deep, well drained, gently sloping to moderately steep, dominantly cherty soils with clayey subsoil, on uplands; and moderately deep, moderately well drained, gently sloping silty soils on ridgetops

5 — Clarksville-Bodine-Mountview association: Dominantly deep, well drained to excessively drained, sloping to steep, cherty and very cherty silty soils on hillsides; and deep, well-drained, gently sloping to sloping silty soils on ridgetops

March 1968

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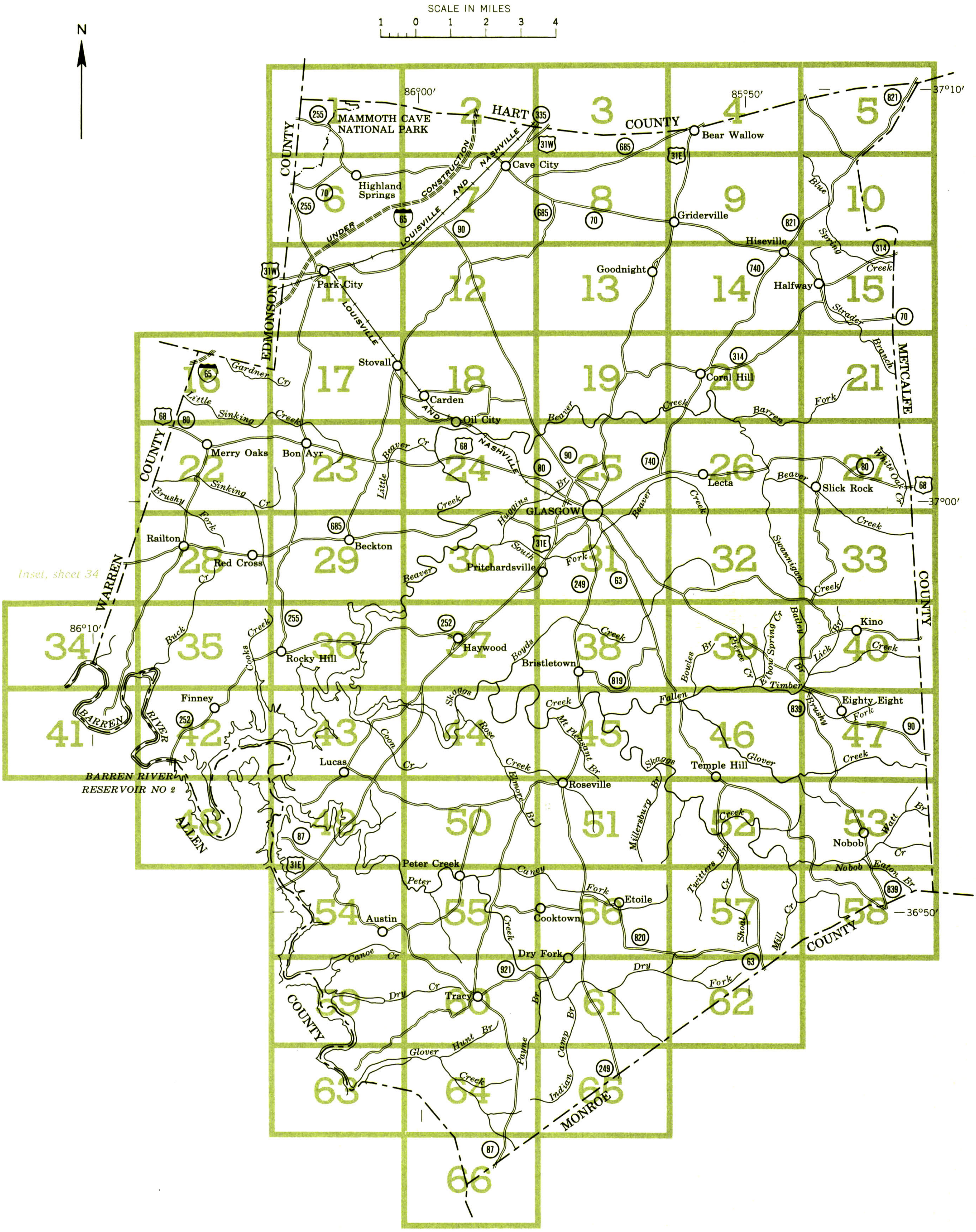
BARREN COUNTY, KENTUCKY



SOIL LEGEND

The first capital letter of each symbol is the first one of the soil name. A second capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils or land types, but some are for land types that have a considerable range in slope. The number, 2 or 3, in the symbol, shows that the soil is eroded or severely eroded.

SYMBOL	NAME
BaB	Baxter cherty silt loam, 2 to 6 percent slopes
BaC2	Baxter cherty silt loam, 6 to 12 percent slopes, eroded
BaD2	Baxter cherty silt loam, 12 to 20 percent slopes, eroded
BaE2	Baxter cherty silt loam, 20 to 30 percent slopes, eroded
BcD3	Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded
BeD2	Baxter very rocky silt loam, 6 to 20 percent slopes, eroded
BeE2	Baxter very rocky silt loam, 20 to 30 percent slopes, eroded
BoC	Bodine cherty silt loam, 6 to 12 percent slopes
BoD	Bodine cherty silt loam, 12 to 20 percent slopes
BoE	Bodine cherty silt loam, 20 to 35 percent slopes
CaD2	Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded
CcD3	Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded
CeB	Christian cherty loam, 2 to 6 percent slopes
CeC2	Christian cherty loam, 6 to 12 percent slopes, eroded
CeD2	Christian cherty loam, 12 to 20 percent slopes, eroded
ChC3	Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded
ChD3	Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded
ClB	Christian silt loam, 2 to 6 percent slopes
ClC2	Christian silt loam, 6 to 12 percent slopes, eroded
CmC3	Christian silty clay loam, 6 to 12 percent slopes, severely eroded
CnB	Clarksville cherty silt loam, 2 to 6 percent slopes
CnC2	Clarksville cherty silt loam, 6 to 12 percent slopes, eroded
CnD2	Clarksville cherty silt loam, 12 to 20 percent slopes, eroded
CnE2	Clarksville cherty silt loam, 20 to 30 percent slopes, eroded
CrB	Crider silt loam, 2 to 6 percent slopes
CrC2	Crider silt loam, 6 to 12 percent slopes, eroded
CtB2	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded
CtC2	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded
CtD2	Cumberland cherty silt loam, 12 to 20 percent slopes, eroded
CuC3	Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded
CuD3	Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded
DcA	Dickson silt loam, 0 to 2 percent slopes
DcB	Dickson silt loam, 2 to 6 percent slopes
DcC2	Dickson silt loam, 6 to 12 percent slopes, eroded
Do	Dowellton silt loam
FdD2	Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded
FrC3	Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded
GaB	Garmon silt loam, 2 to 6 percent slopes
GaC2	Garmon silt loam, 6 to 12 percent slopes, eroded
GaD	Garmon silt loam, 12 to 20 percent slopes
GaE	Garmon silt loam, 20 to 35 percent slopes
GmE3	Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded
Gu	Gullied land
Ha	Hamblen silt loam
HuB	Humphreys cherty silt loam, 2 to 6 percent slopes
HuC2	Humphreys cherty silt loam, 6 to 12 percent slopes, eroded
Ma	Made land
Me	Melvin silt loam
Mf	Morganfield silt loam
MoB	Mountview silt loam, 2 to 6 percent slopes
MoC2	Mountview silt loam, 6 to 12 percent slopes, eroded
NdB	Needmore silt loam, 2 to 6 percent slopes
NeC2	Needmore silty clay loam, 6 to 12 percent slopes, eroded
NmC3	Needmore silty clay, 6 to 12 percent slopes, severely eroded
Nn	Newark silt loam
NoB	Nolichucky fine sandy loam, 2 to 6 percent slopes
NoC2	Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded
PbB	Pembroke silt loam, 2 to 6 percent slopes
PbC2	Pembroke silt loam, 6 to 12 percent slopes, eroded
PeC3	Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded
Rg	Robinsonville gravelly silt loam
Ro	Rock land
Rs	Roellen silty clay loam
SaA	Sango silt loam, 0 to 2 percent slopes
SaB	Sango silt loam, 2 to 6 percent slopes
St	Staser silt loam
Ta	Taft silt loam
TbB2	Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded
TbC2	Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded
TbD2	Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded
TcC3	Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded
TlB2	Talbott silty clay loam, 2 to 6 percent slopes, eroded
TlC2	Talbott silty clay loam, 6 to 12 percent slopes, eroded
TrB	Tarklin cherty silt loam, 2 to 6 percent slopes
TrC	Tarklin cherty silt loam, 6 to 12 percent slopes
WrD	Weikert and Ramsey stony soils, 12 to 20 percent slopes
WrE	Weikert and Ramsey stony soils, 20 to 50 percent slopes
WsC	Wellston silt loam, 6 to 12 percent slopes
ZaB	Zanesville silt loam, 2 to 6 percent slopes

NOTE: Barren River Reservoir No. 2 normal pool shoreline, as shown on the soil maps, is the approximate water level in 1964. Since 1964, the normal pool is higher and at maximum elevation 552 feet. The seasonal flood pool line is shown approximately on the soil maps by dashed line. Soils are surveyed to this line as in 1964. Since 1964, the seasonal flood pool line is higher and controlled to not exceed maximum elevation 590 feet.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings
- School
- Church
- Station

Mines and Quarries

Mine dump

Pits, gravel or other

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent

Wells, water (flowing)

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stony, very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully

Soil map constructed 1967 by Cartographic Division, Soil Conservation Service, USDA, from 1964 aerial photographs. Controlled mosaic based on Kentucky plane coordinate system, south zone, Lambert conformal conic projection, 1927 North American datum.

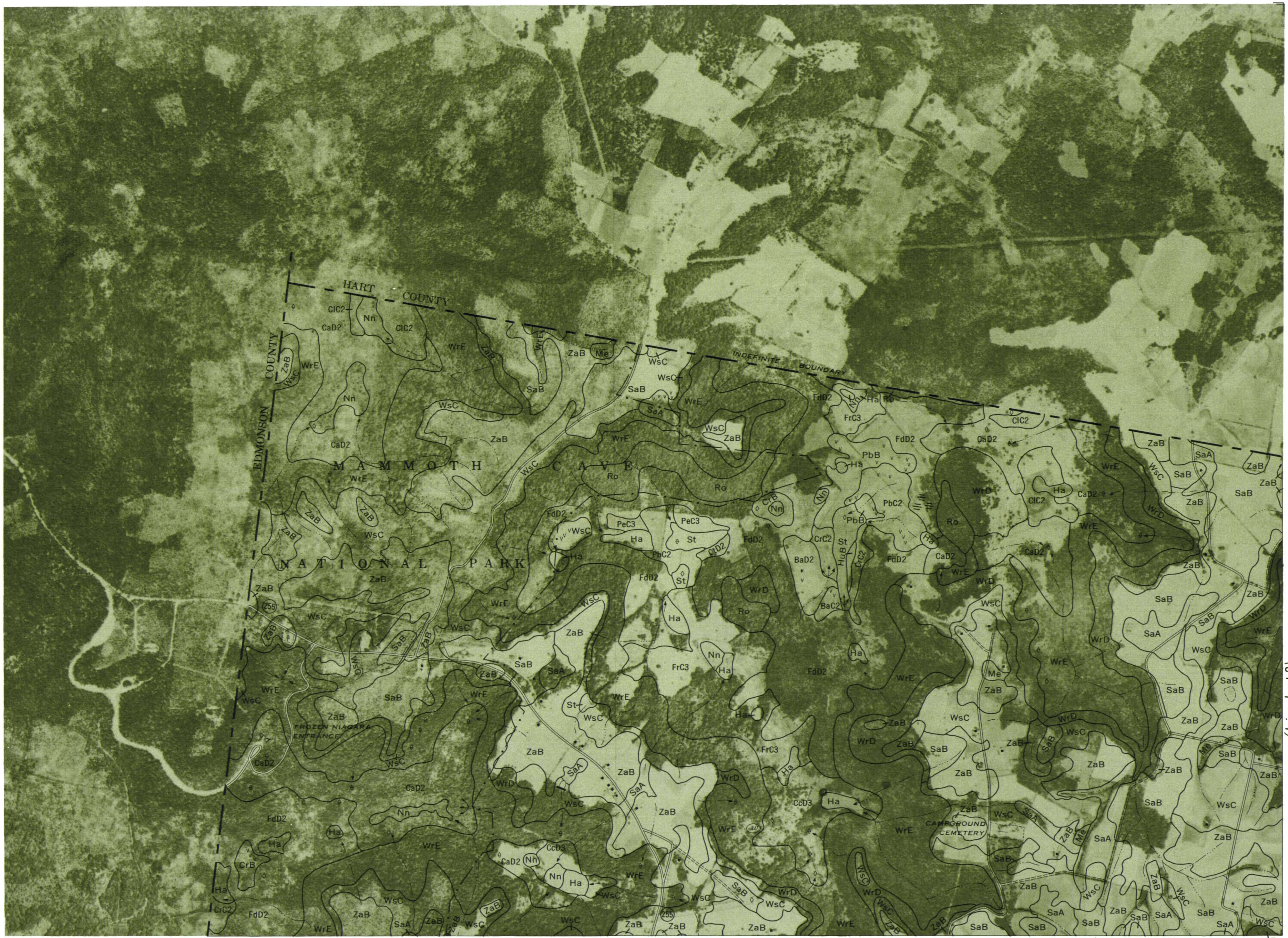
GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent, table 1, page 7.
Estimated yields, table 2, page 42.
Suitability of soils for wildlife habitat, table 3, page 49.
Engineering applications, table 4, page 54, table 5, page 56, and table 6, page 60.
Limitations of soils for nonfarm and recreational developments, table 7, page 66.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group	
			Symbol	Page	Number	Page
BaB	Baxter cherty silt loam, 2 to 6 percent slopes	9	IIe-11	36	1	44
BaC2	Baxter cherty silt loam, 6 to 12 percent slopes, eroded	9	IIIe-6	37	1	44
BaD2	Baxter cherty silt loam, 12 to 20 percent slopes, eroded	9	IVe-3	38	1	44
BaE2	Baxter cherty silt loam, 20 to 30 percent slopes, eroded	9	VIe-1	39	1	44
BcD3	Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded	9	VIe-2	39	3	45
BeD2	Baxter very rocky silt loam, 6 to 20 percent slopes, eroded	9	VIs-1	39	8	47
BeE2	Baxter very rocky silt loam, 20 to 30 percent slopes, eroded	9	VIIs-2	41	8	47
BoC	Bodine cherty silt loam, 6 to 12 percent slopes	10	IVs-2	39	4	45
BoD	Bodine cherty silt loam, 12 to 20 percent slopes	10	VIs-3	40	4	45
BoE	Bodine cherty silt loam, 20 to 35 percent slopes	10	VIIs-1	40	4	45
CaD2	Caneyville very rocky silty clay loam, 6 to 20 percent slopes, eroded	11	VIs-1	39	8	47
CcD3	Caneyville very rocky silty clay, 12 to 25 percent slopes, severely eroded	11	VIIs-2	41	3	45
CeB	Christian cherty loam, 2 to 6 percent slopes	12	IIe-11	36	1	44
CeC2	Christian cherty loam, 6 to 12 percent slopes, eroded	12	IIIe-6	37	1	44
CeD2	Christian cherty loam, 12 to 20 percent slopes, eroded	12	IVe-3	38	1	44
ChC3	Christian cherty sandy clay loam, 6 to 12 percent slopes, severely eroded	12	IVe-11	38	3	45
ChD3	Christian cherty sandy clay loam, 12 to 20 percent slopes, severely eroded	12	VIe-2	39	3	45
ClB	Christian silt loam, 2 to 6 percent slopes	12	IIe-1	35	1	44
ClC2	Christian silt loam, 6 to 12 percent slopes, eroded	12	IIIe-1	36	1	44
CmC3	Christian silty clay loam, 6 to 12 percent slopes, severely eroded	12	IVe-11	38	3	45
CnB	Clarksville cherty silt loam, 2 to 6 percent slopes	13	IIe-11	36	1	44
CnC2	Clarksville cherty silt loam, 6 to 12 percent slopes, eroded	13	IIIe-6	37	1	44
CnD2	Clarksville cherty silt loam, 12 to 20 percent slopes, eroded	13	IVe-3	38	1	44
CnE2	Clarksville cherty silt loam, 20 to 30 percent slopes, eroded	13	VIe-1	39	1	44
CrB	Crider silt loam, 2 to 6 percent slopes	14	IIe-1	35	1	44
CrC2	Crider silt loam, 6 to 12 percent slopes, eroded	14	IIIe-1	36	1	44
CtB2	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded	15	IIe-11	36	1	44
CtC2	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded	15	IIIe-6	37	1	44
CtD2	Cumberland cherty silt loam, 12 to 20 percent slopes, eroded	15	IVe-3	38	1	44
CuC3	Cumberland cherty silty clay, 6 to 12 percent slopes, severely eroded	16	IVe-11	38	3	45
CuD3	Cumberland cherty silty clay, 12 to 20 percent slopes, severely eroded	16	VIe-2	39	3	45
DcA	Dickson silt loam, 0 to 2 percent slopes	16	IIw-1	36	6	46
DcB	Dickson silt loam, 2 to 6 percent slopes	16	IIe-10	35	1	44
DcC2	Dickson silt loam, 6 to 12 percent slopes, eroded	16	IIIe-1	36	1	44
Do	Dowellton silt loam	17	IVw-1	39	7	46
FdD2	Fredonia very rocky silty clay loam, 6 to 20 percent slopes, eroded	18	VIs-1	39	8	47
FrC3	Fredonia very rocky silty clay, 6 to 12 percent slopes, severely eroded	18	VIs-1	39	3	45
GaB	Garmon silt loam, 2 to 6 percent slopes	18	IIe-10	35	2	45
GaC2	Garmon silt loam, 6 to 12 percent slopes, eroded	18	IVs-2	39	2	45
GaD	Garmon silt loam, 12 to 20 percent slopes	19	VIs-3	40	2	45
GaE	Garmon silt loam, 20 to 35 percent slopes	19	VIIe-2	40	2	45
GmE3	Garmon shaly silt loam, 15 to 25 percent slopes, severely eroded	19	VIIs-2	41	3	45
Gu	Gullied land	19	VIIe-4	40	10	47
Ha	Hamblen silt loam	20	I-2	35	5	46
HuB	Humphreys cherty silt loam, 2 to 6 percent slopes	20	IIe-11	36	1	44
HuC2	Humphreys cherty silt loam, 6 to 12 percent slopes, eroded	20	IIIe-6	37	1	44
Ma	Made land	20	------	--	10	47
Me	Melvin silt loam	21	IIIw-5	38	7	46
Mf	Morganfield silt loam	21	I-1	35	5	46
MoB	Mountview silt loam, 2 to 6 percent slopes	22	IIe-1	35	1	44
MoC2	Mountview silt loam, 6 to 12 percent slopes, eroded	22	IIIe-1	36	1	44
NdB	Needmore silt loam, 2 to 6 percent slopes	22	IIIe-14	37	8	47
NeC2	Needmore silty clay loam, 6 to 12 percent slopes, eroded	23	IVe-8	38	8	47
NmC3	Needmore silty clay, 6 to 12 percent slopes, severely eroded	23	VIe-2	39	3	45
Nn	Newark silt loam	23	IIw-4	36	7	46
NoB	Nolichucky fine sandy loam, 2 to 6 percent slopes	24	IIe-1	35	1	44
NoC2	Nolichucky fine sandy loam, 6 to 12 percent slopes, eroded	24	IIIe-1	36	1	44
PbB	Pembroke silt loam, 2 to 6 percent slopes	25	IIe-1	35	1	44
PbC2	Pembroke silt loam, 6 to 12 percent slopes, eroded	25	IIIe-1	36	1	44
PeC3	Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded	25	IVe-11	38	3	45
Rg	Robinsonville gravelly silt loam	26	IIs-1	36	5	46
Ro	Rock land	26	VIIs-5	41	10	47
Rs	Roellen silty clay loam	27	IIIw-5	38	7	46
SaA	Sango silt loam, 0 to 2 percent slopes	27	IIw-1	36	6	46
SaB	Sango silt loam, 2 to 6 percent slopes	28	IIe-10	35	6	46
St	Staser silt loam	28	I-1	35	5	46
Ta	Taft silt loam	29	IIIw-1	37	7	46
TbB2	Talbott cherty silty clay loam, 2 to 6 percent slopes, eroded	29	IIIe-14	37	8	47
TbC2	Talbott cherty silty clay loam, 6 to 12 percent slopes, eroded	29	IVe-8	38	8	47
TbD2	Talbott cherty silty clay loam, 12 to 20 percent slopes, eroded	30	VIe-1	39	8	47
TcC3	Talbott cherty silty clay, 6 to 12 percent slopes, severely eroded	29	VIe-2	39	3	45
TlB2	Talbott silty clay loam, 2 to 6 percent slopes, eroded	30	IIIe-14	37	8	47
TlC2	Talbott silty clay loam, 6 to 12 percent slopes, eroded	30	IVe-8	38	8	47
TrB	Tarklin cherty silt loam, 2 to 6 percent slopes	30	IIe-10	35	6	46
TrC	Tarklin cherty silt loam, 6 to 12 percent slopes	31	IIIe-6	37	6	46
WrD	Weikert and Ramsey stony soils, 12 to 20 percent slopes	31	VIIs-1	40	9	47
WrE	Weikert and Ramsey stony soils, 20 to 50 percent slopes	31	VIIs-1	40	9	47
WsC	Wellston silt loam, 6 to 12 percent slopes	32	IIIe-1	36	2	45
ZaB	Zanesville silt loam, 2 to 6 percent slopes	32	IIe-10	35	6	46

298-343 O - 69 (Faces soil maps)



(Joins sheet 2)

(Joins sheet 6)

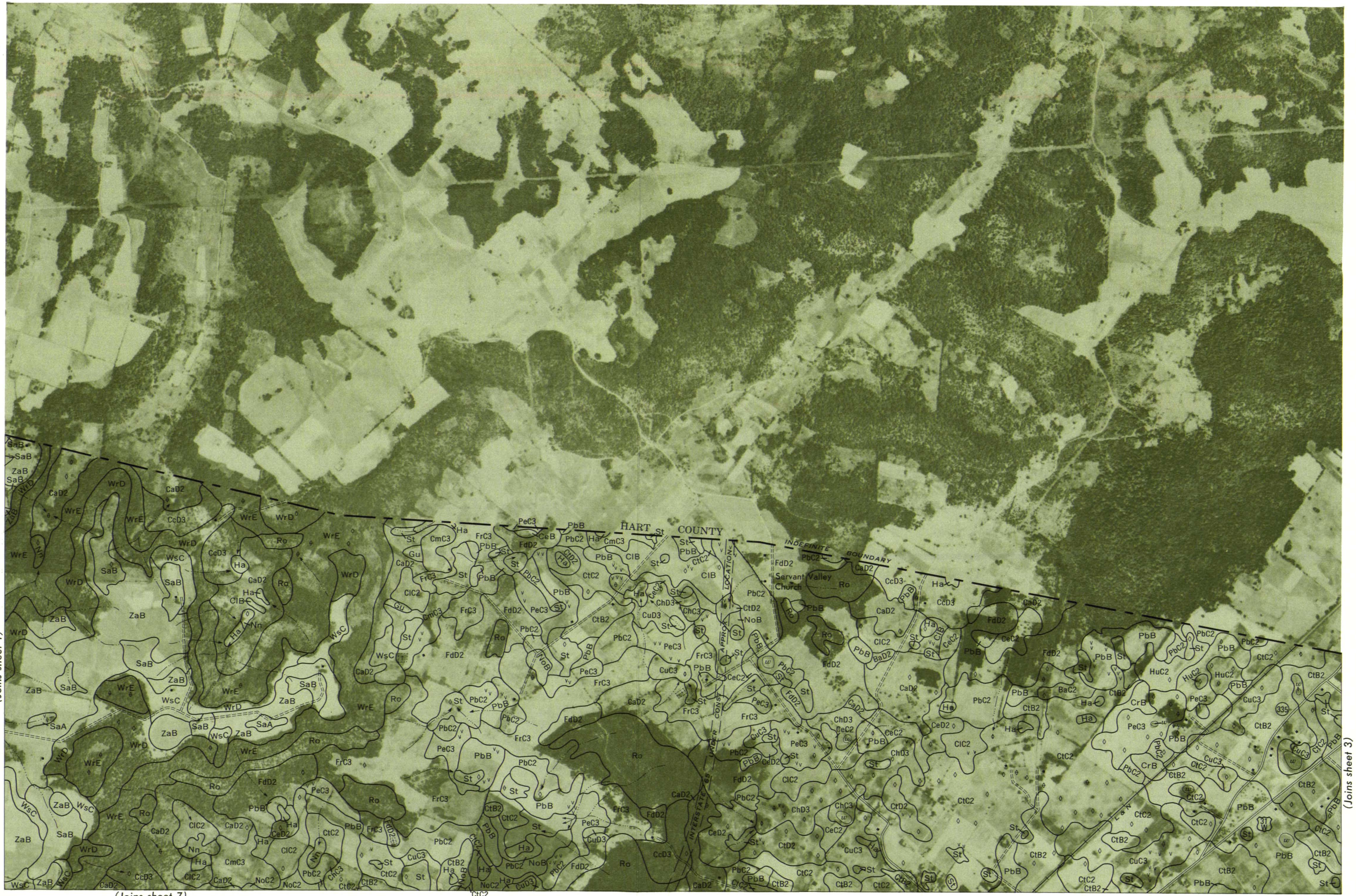
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 1

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

2

N



0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 2

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

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This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.
BARREN COUNTY, KENTUCKY NO. 3

4

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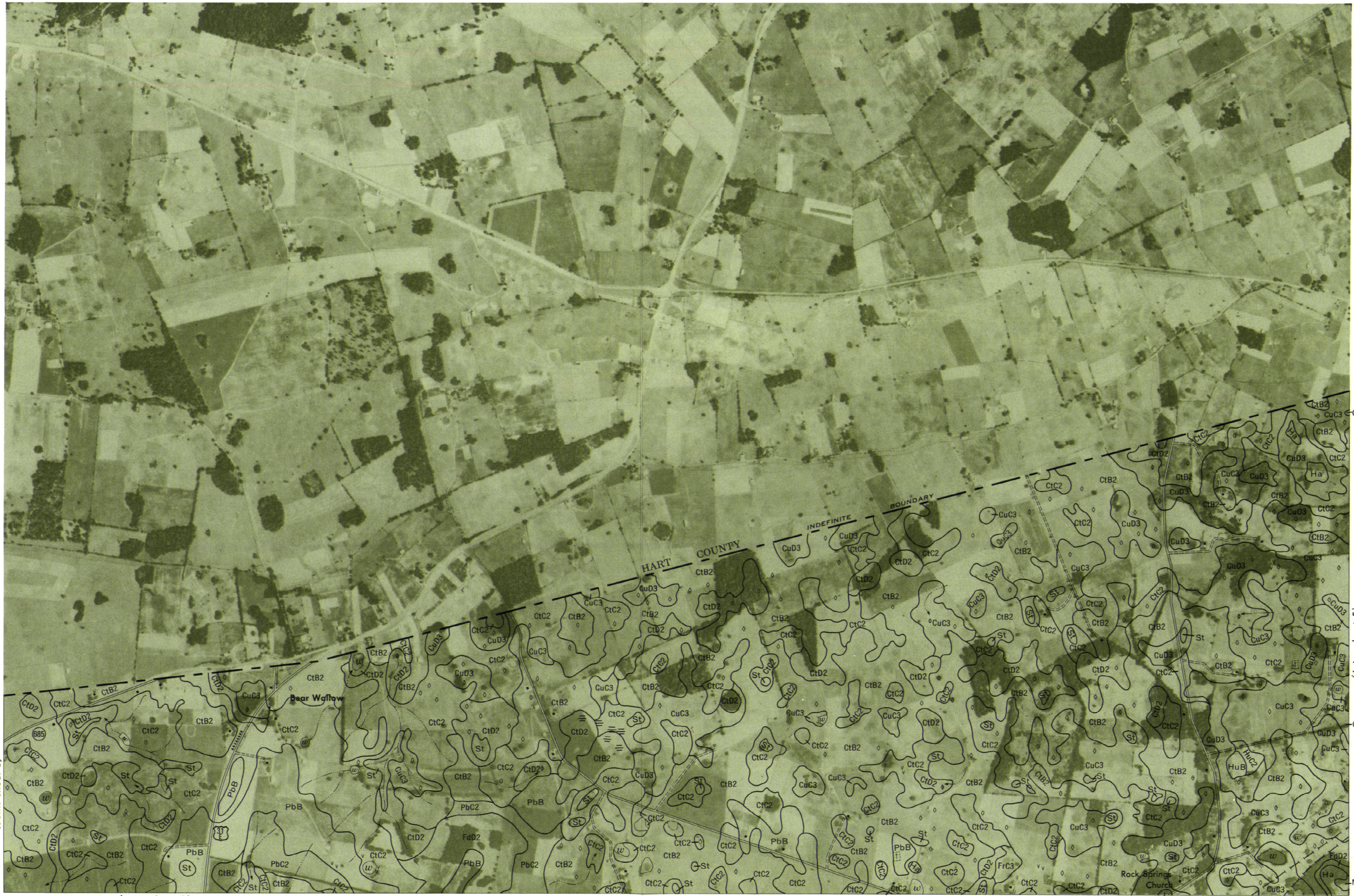

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0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 4

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

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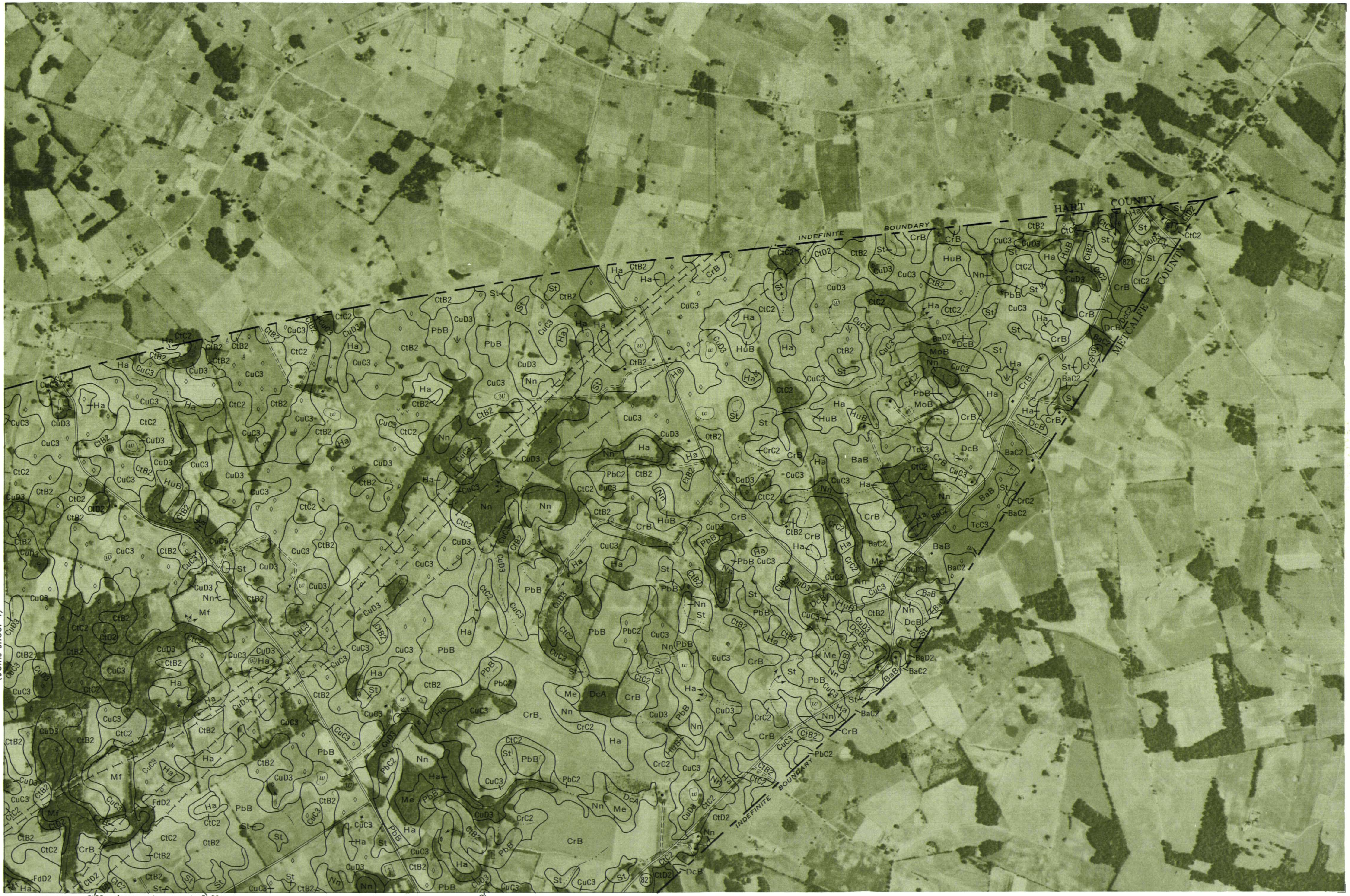

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0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

6

N

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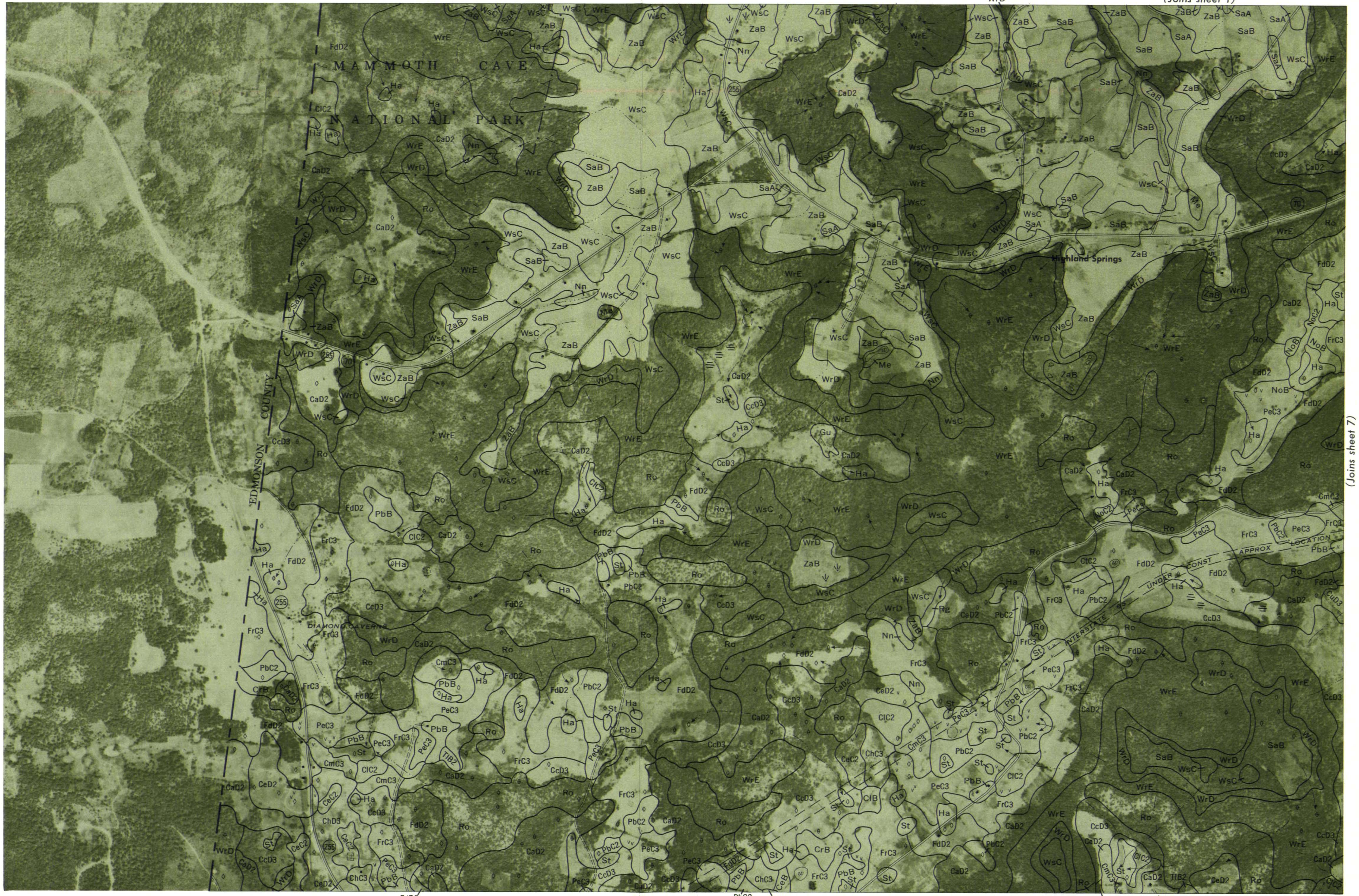

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0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 6

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

7

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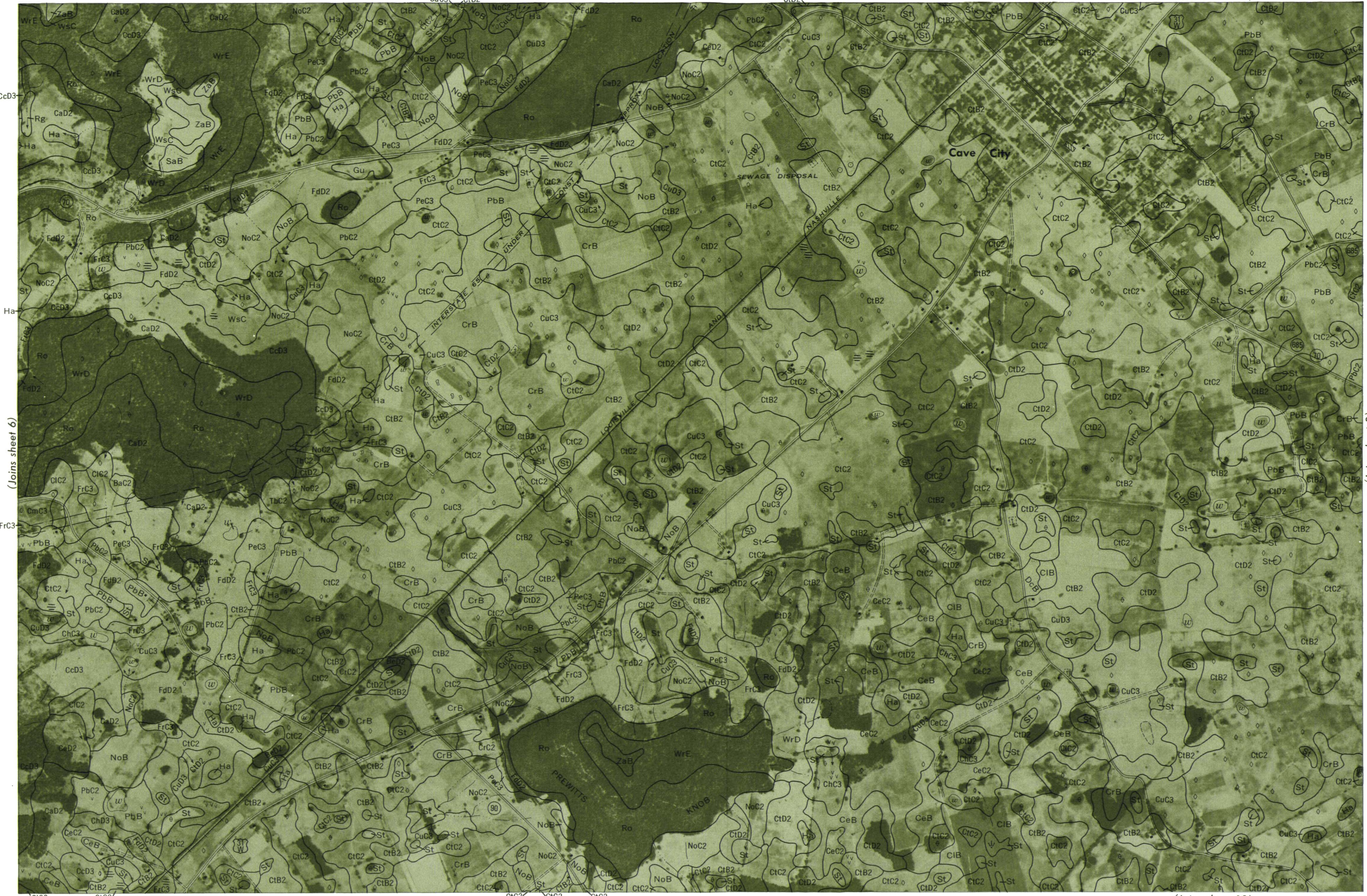
(Joins sheet 6)

(Joins sheet 8)



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0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 7

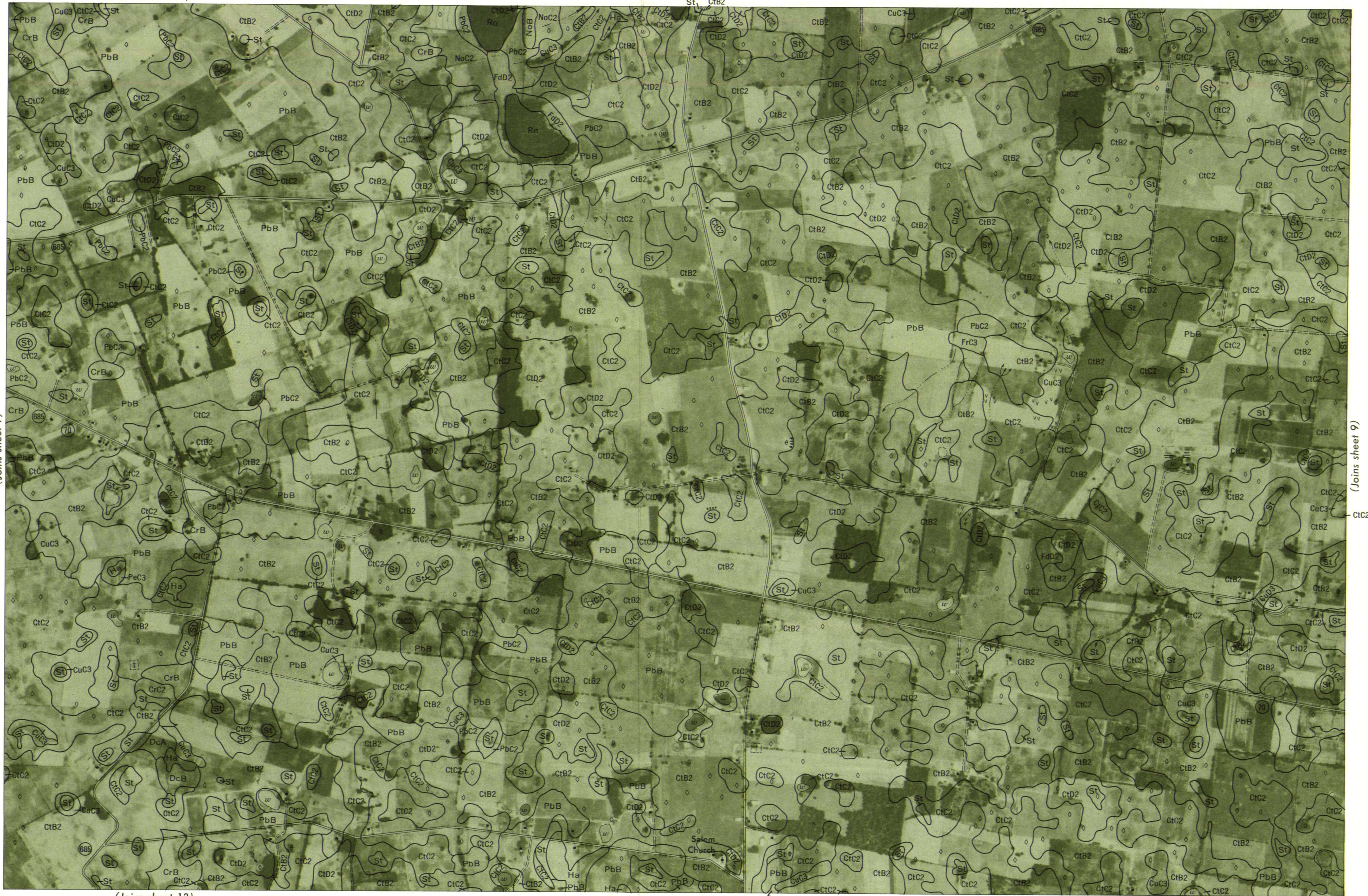
8

BARREN COUNTY, KENTUCKY — SHEET NUMBER 8

(Joins sheet 3)

N

(Joins sheet 7)



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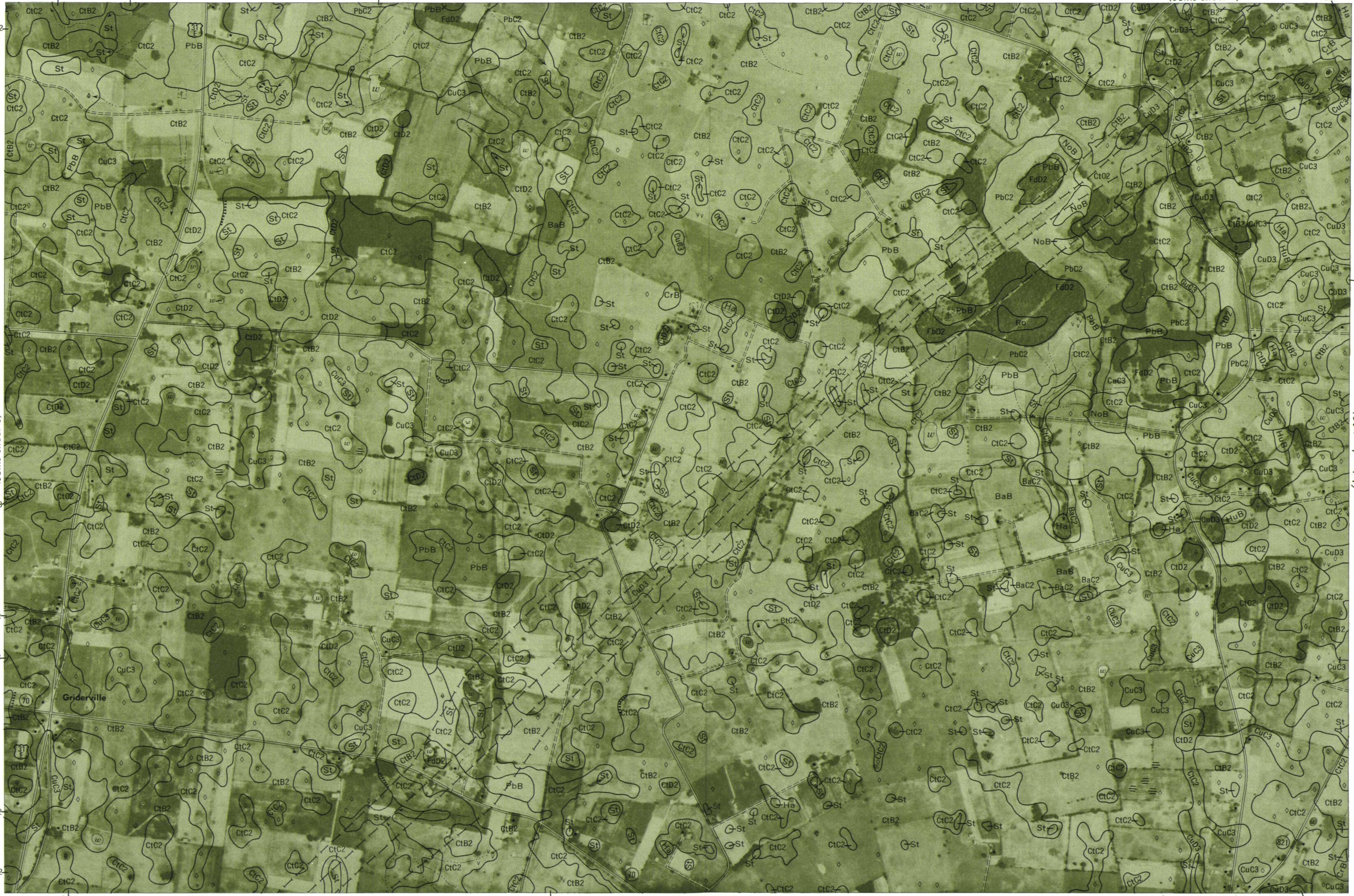
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 8

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

9



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This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 9

10

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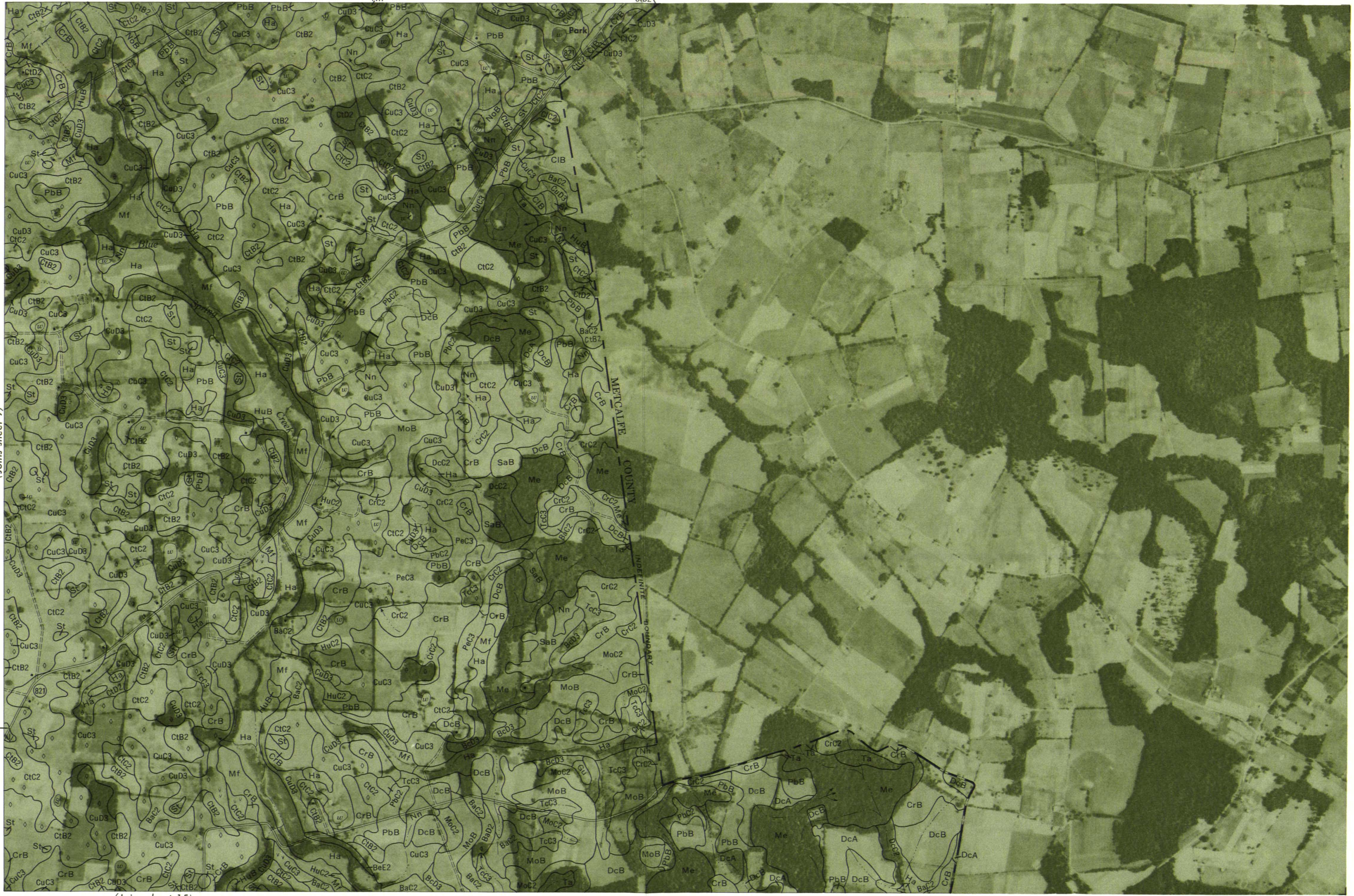
N

(Joins sheet 9)



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0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 10

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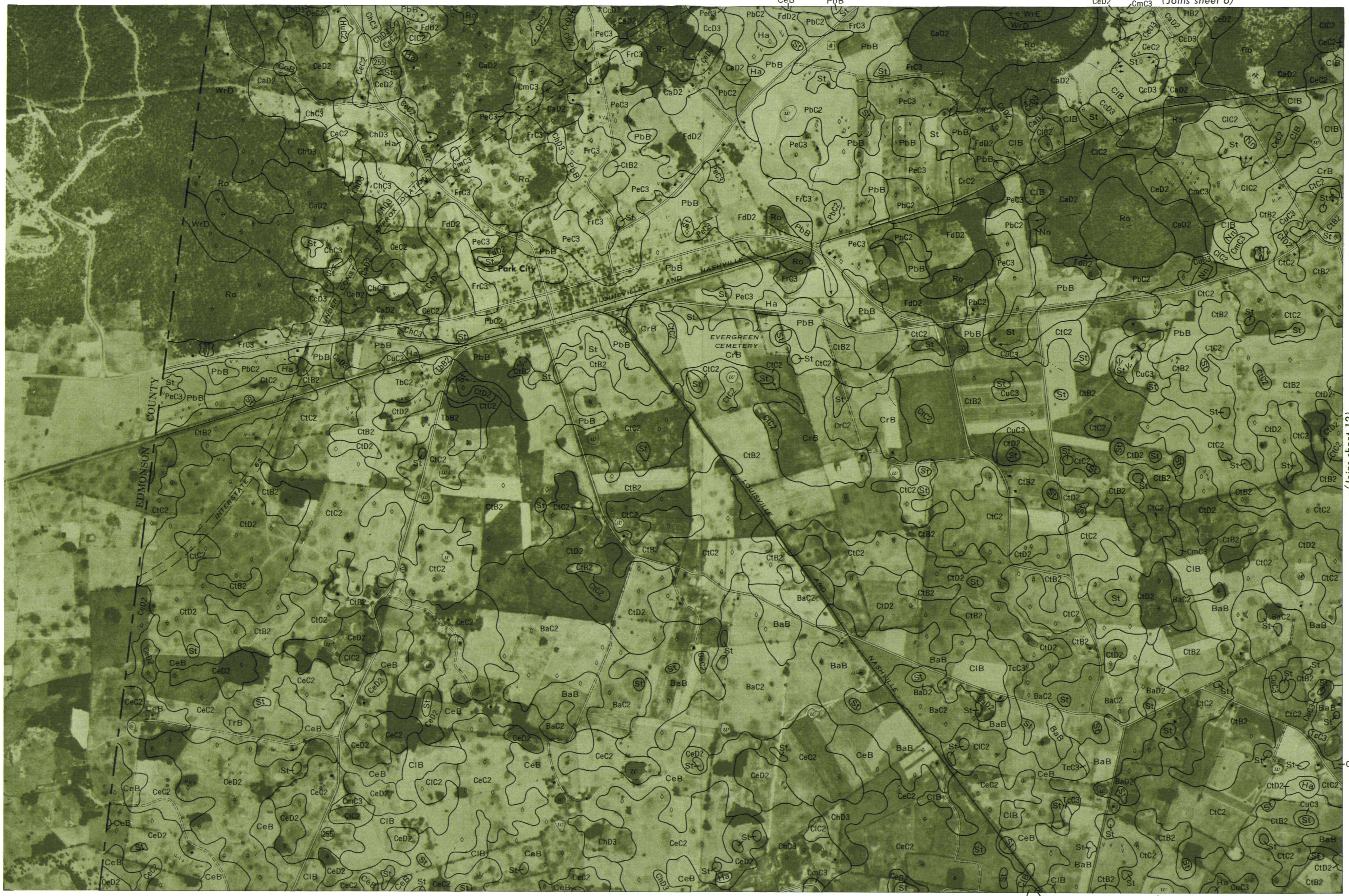
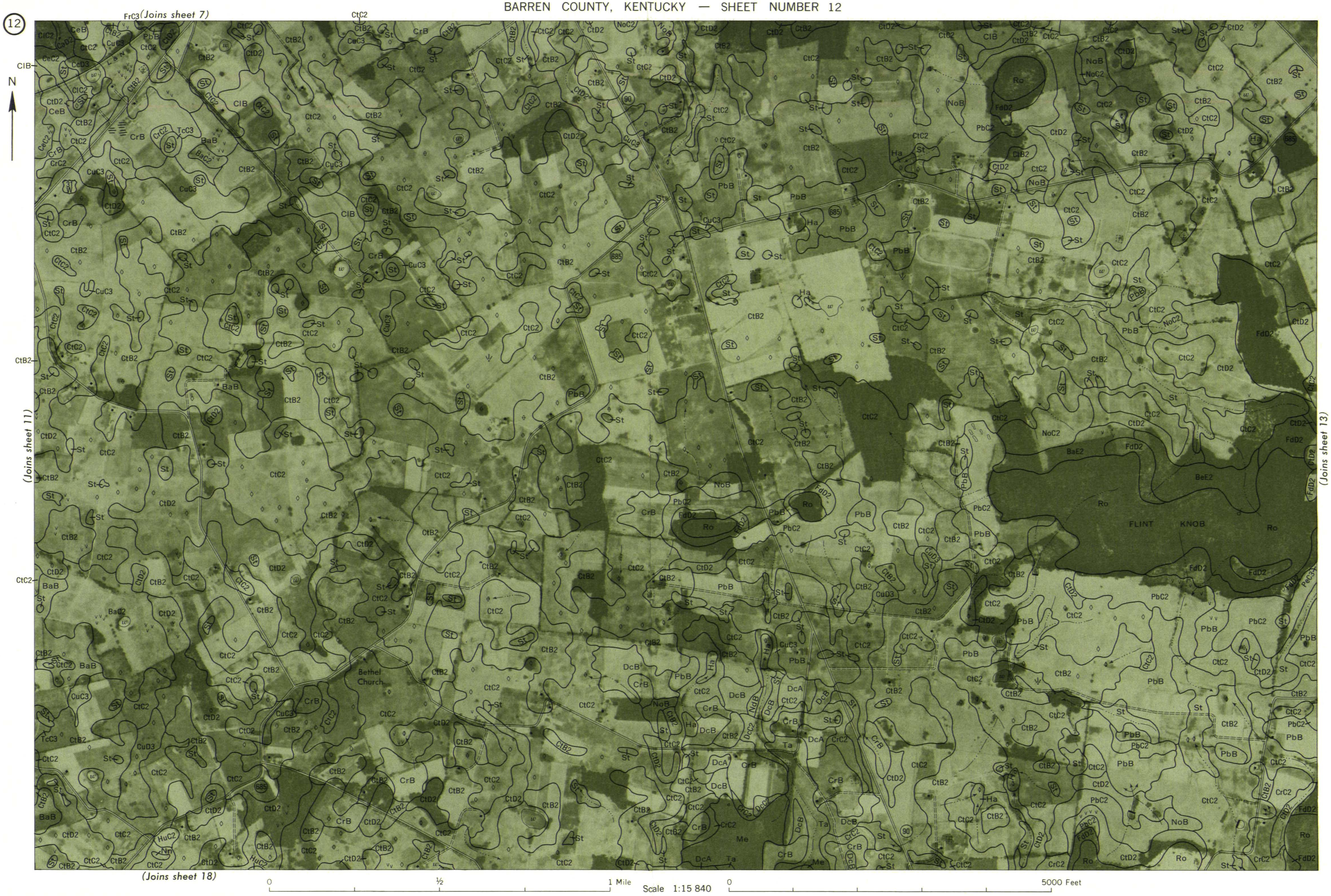


0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO.11

BARREN COUNTY, KENTUCKY — SHEET NUMBER 12



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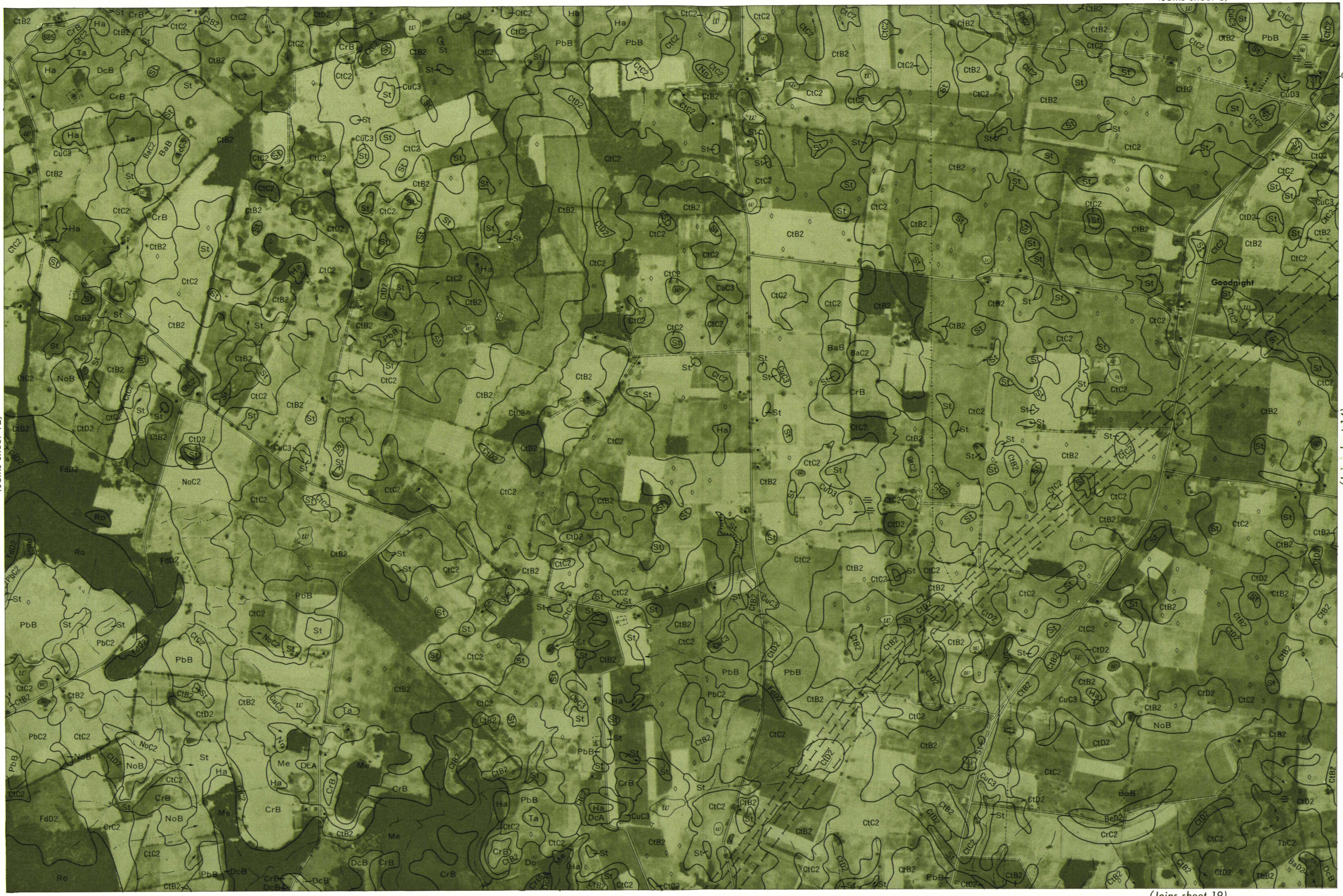
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

14

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BARREN COUNTY, KENTUCKY — SHEET NUMBER 14

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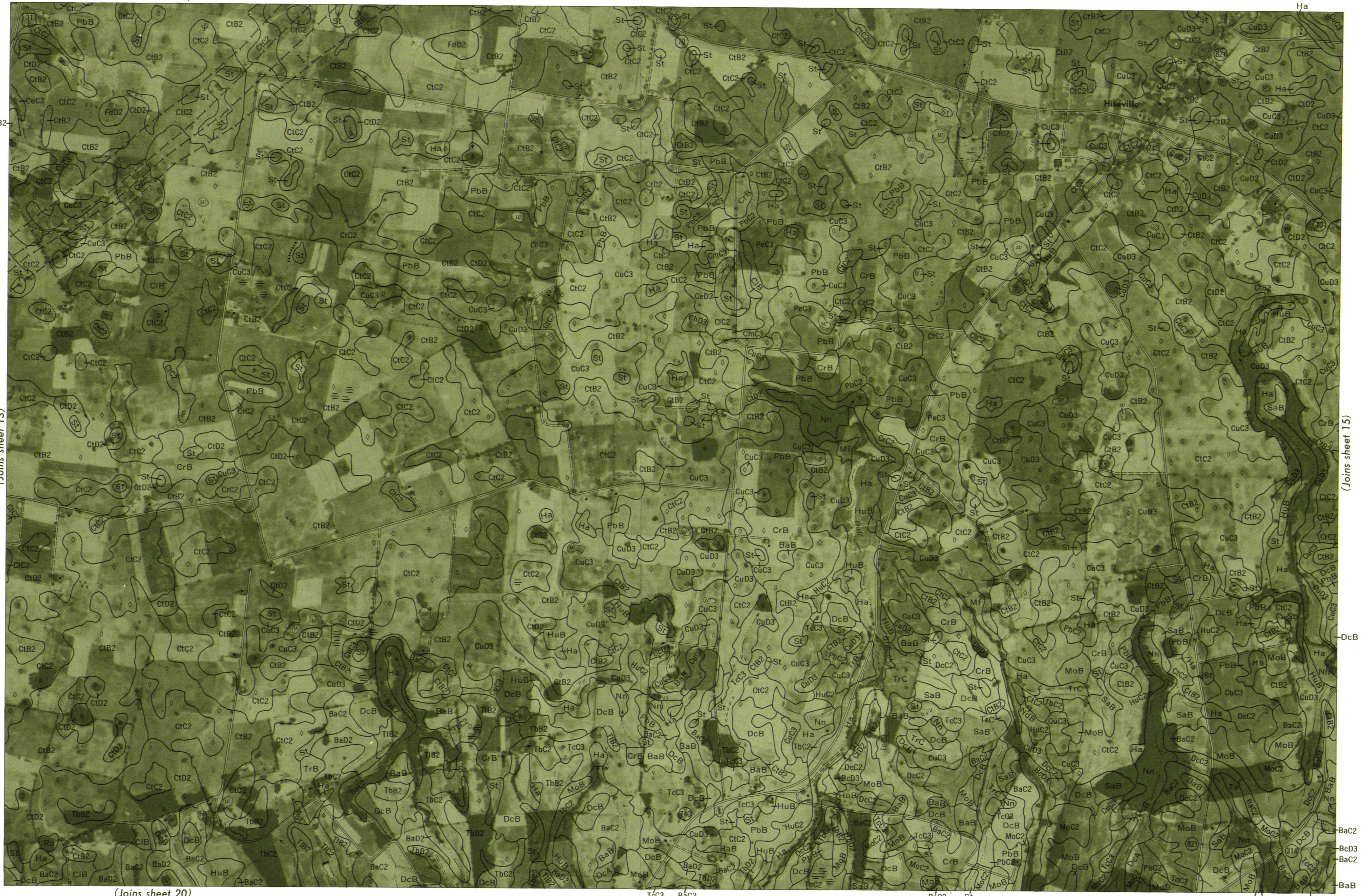

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0 ½ 1 Mile

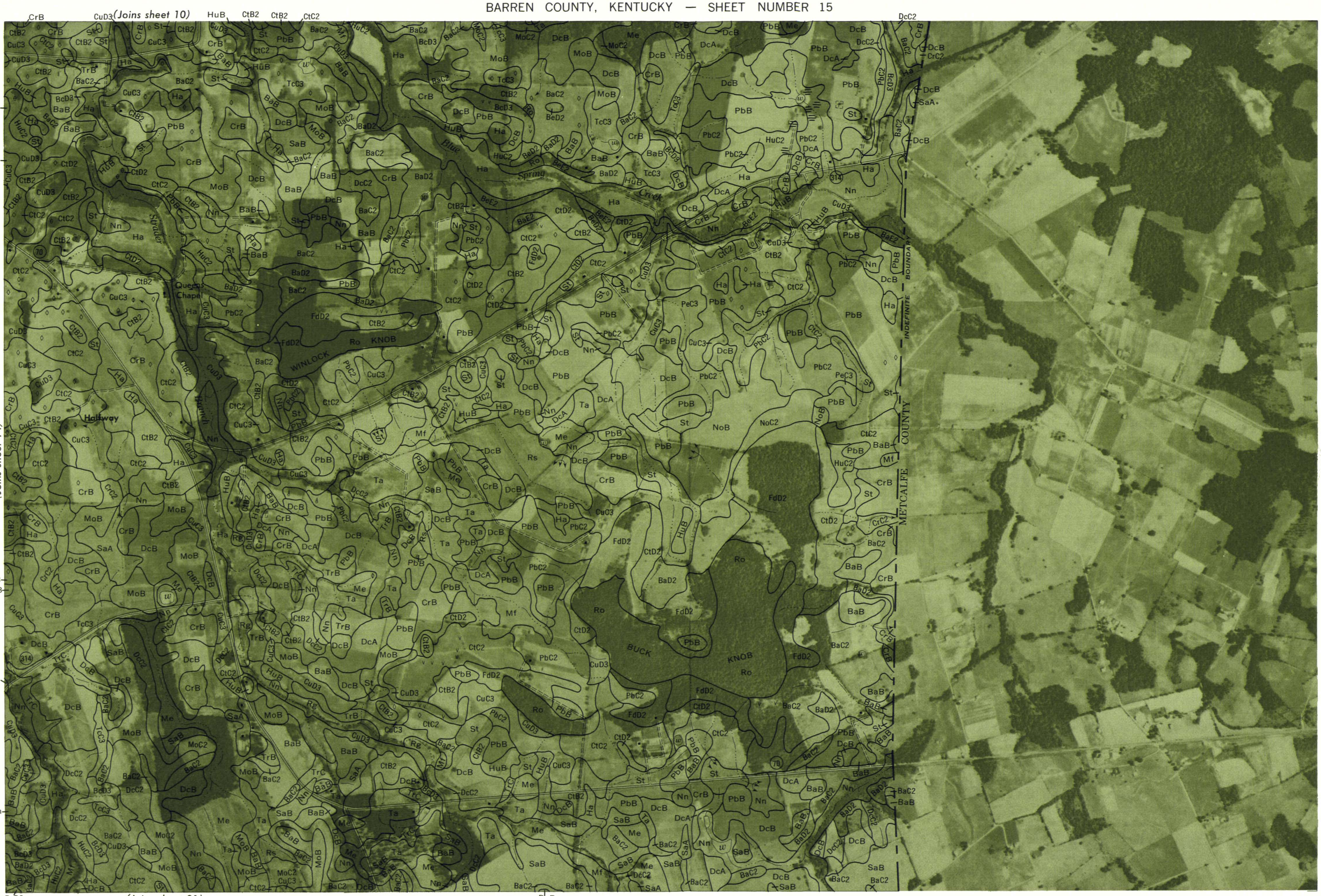
Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 14

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

15



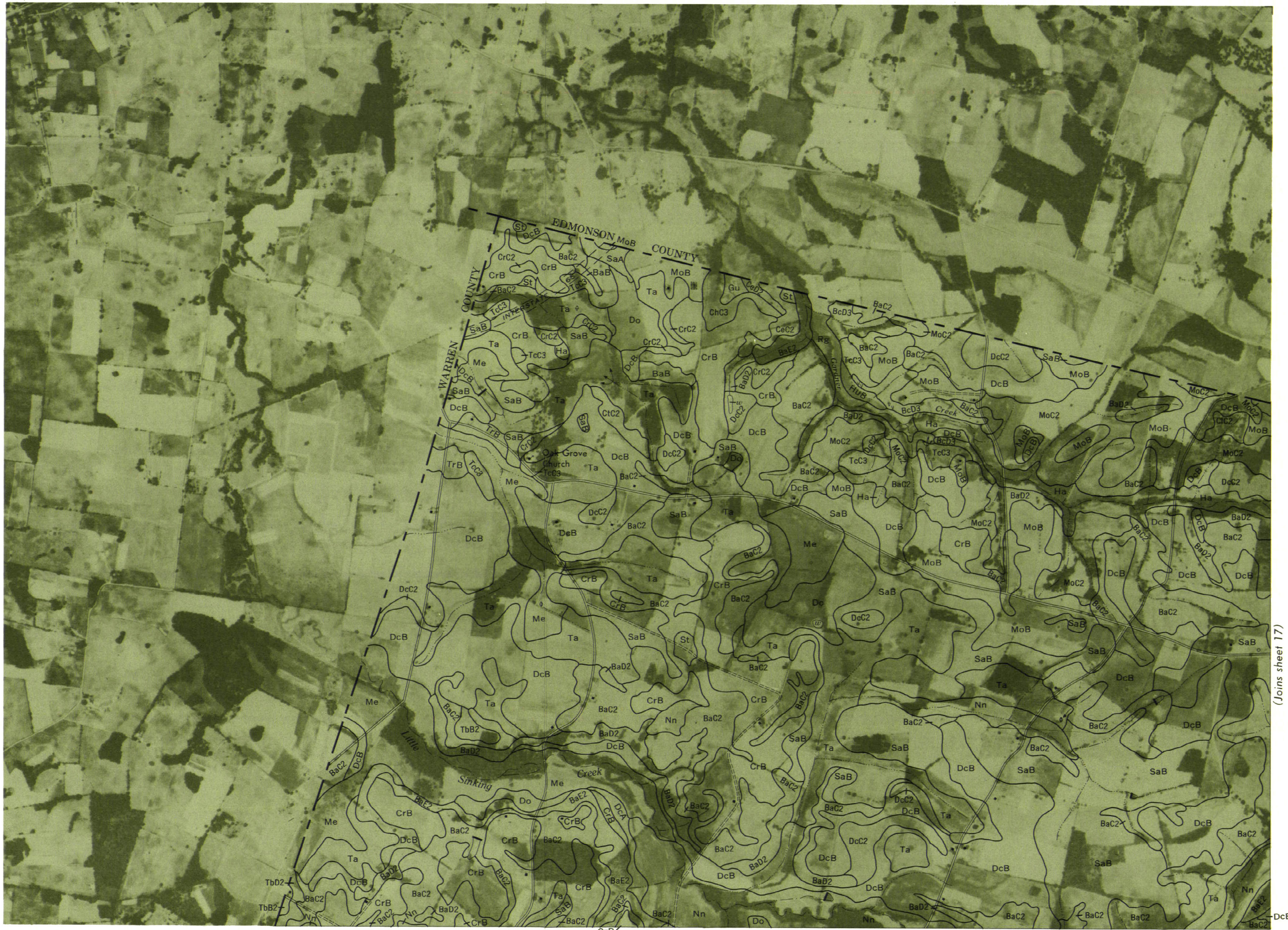
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO.15

BARREN COUNTY, KENTUCKY — SHEET NUMBER 16

N



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0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 16

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

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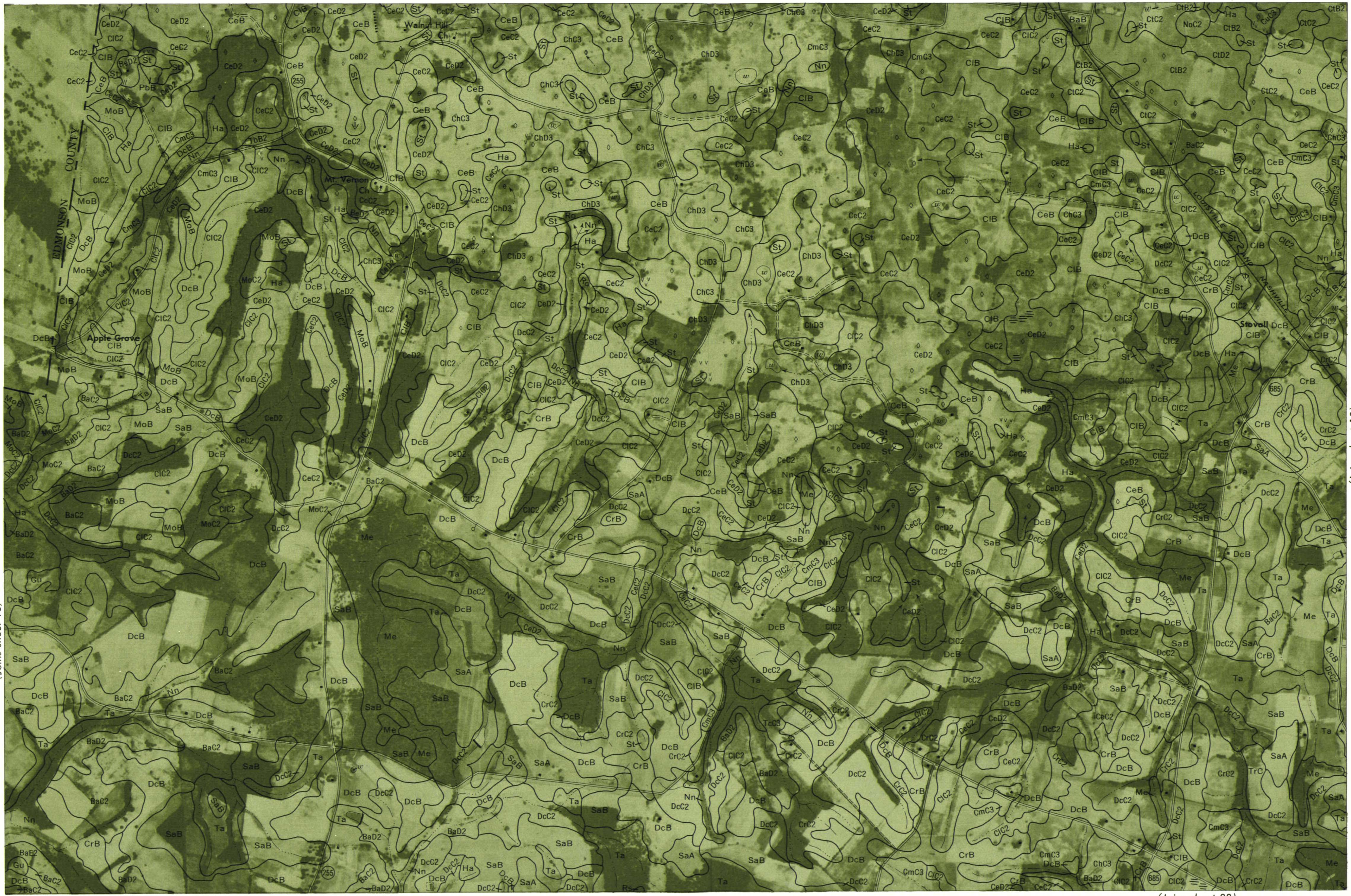
17



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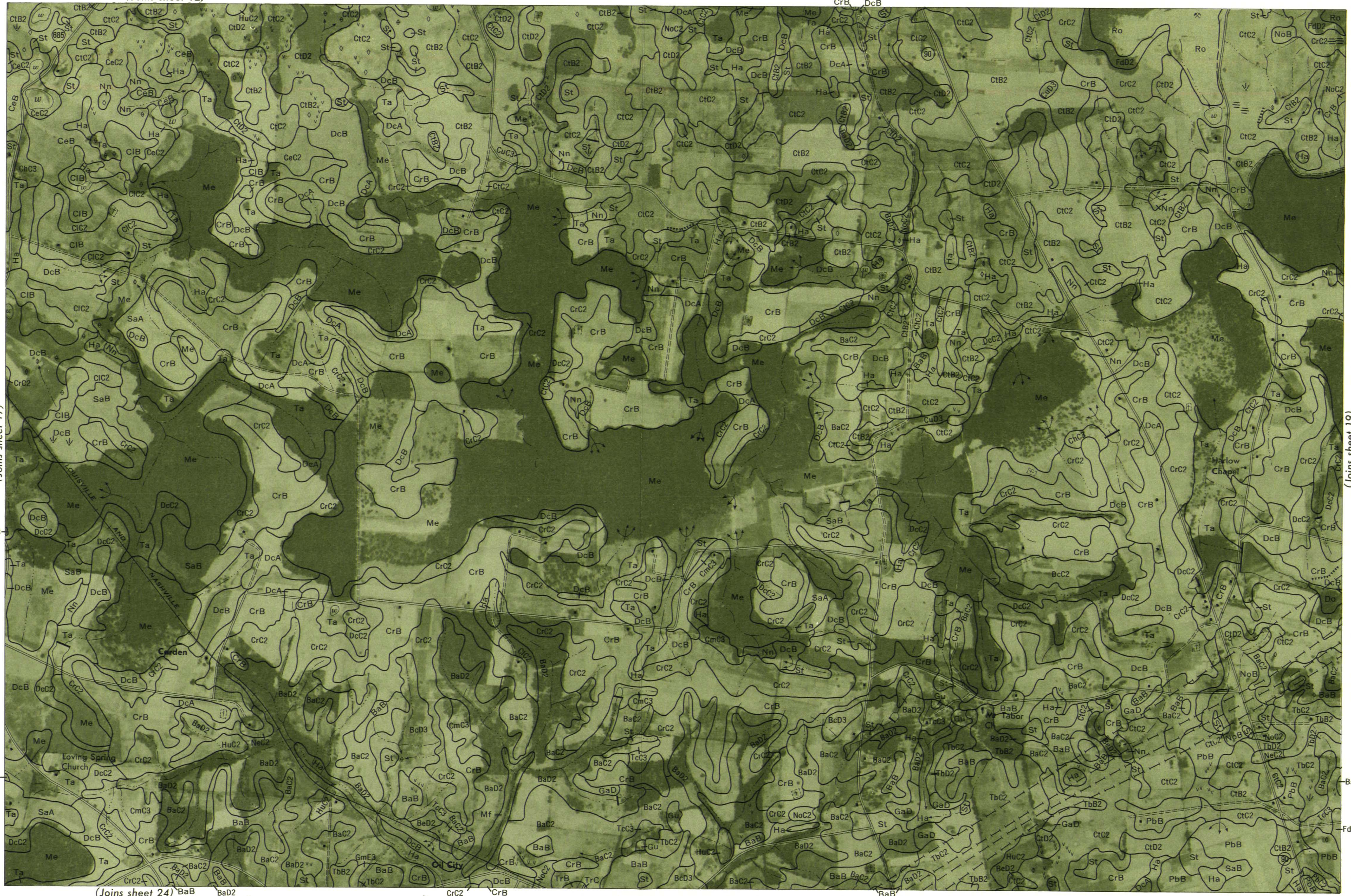
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO.17

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

18

(Joins sheet 12)



0 ½ 1 Mile

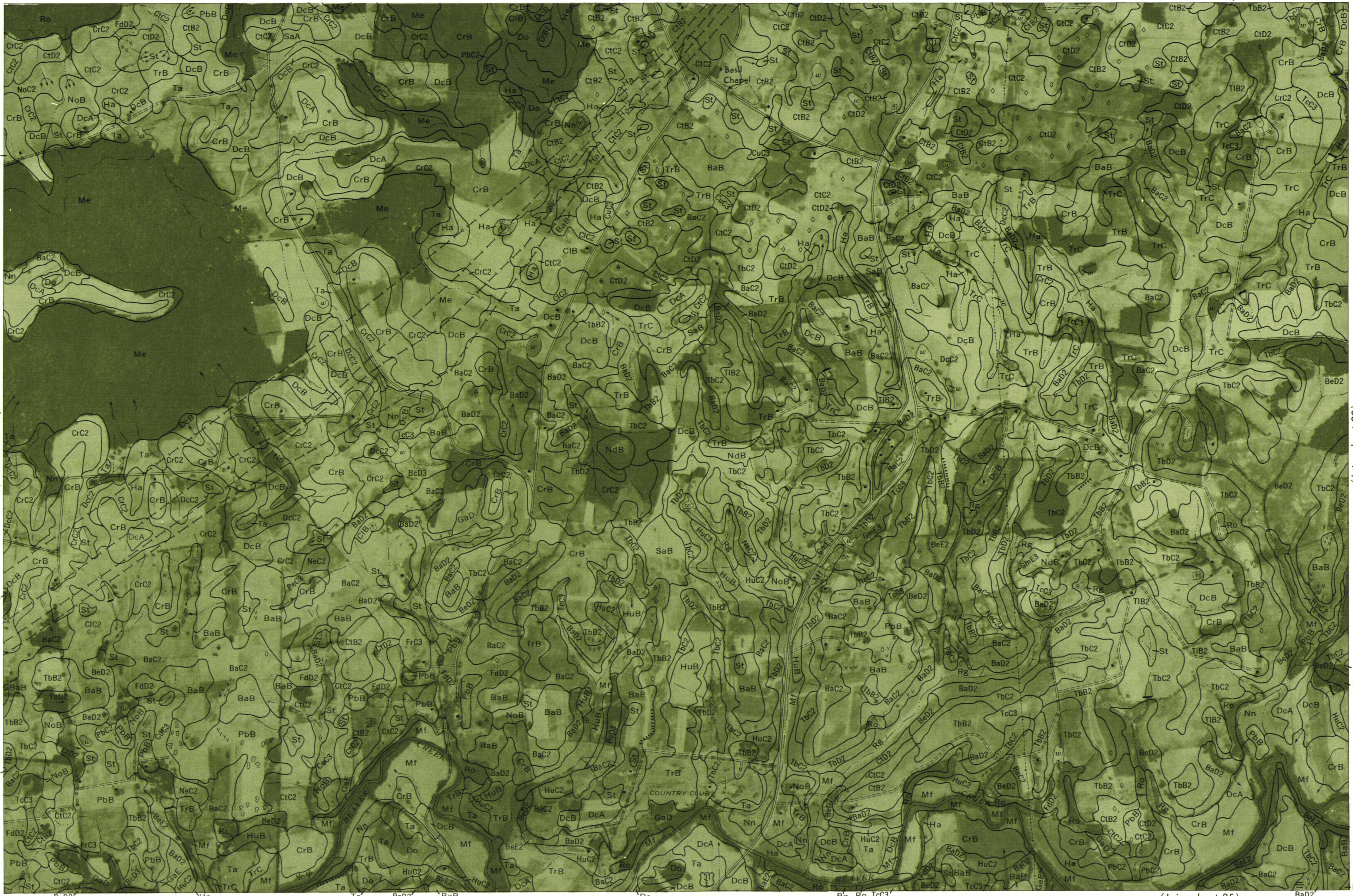
Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 18

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 13)



(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 25)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

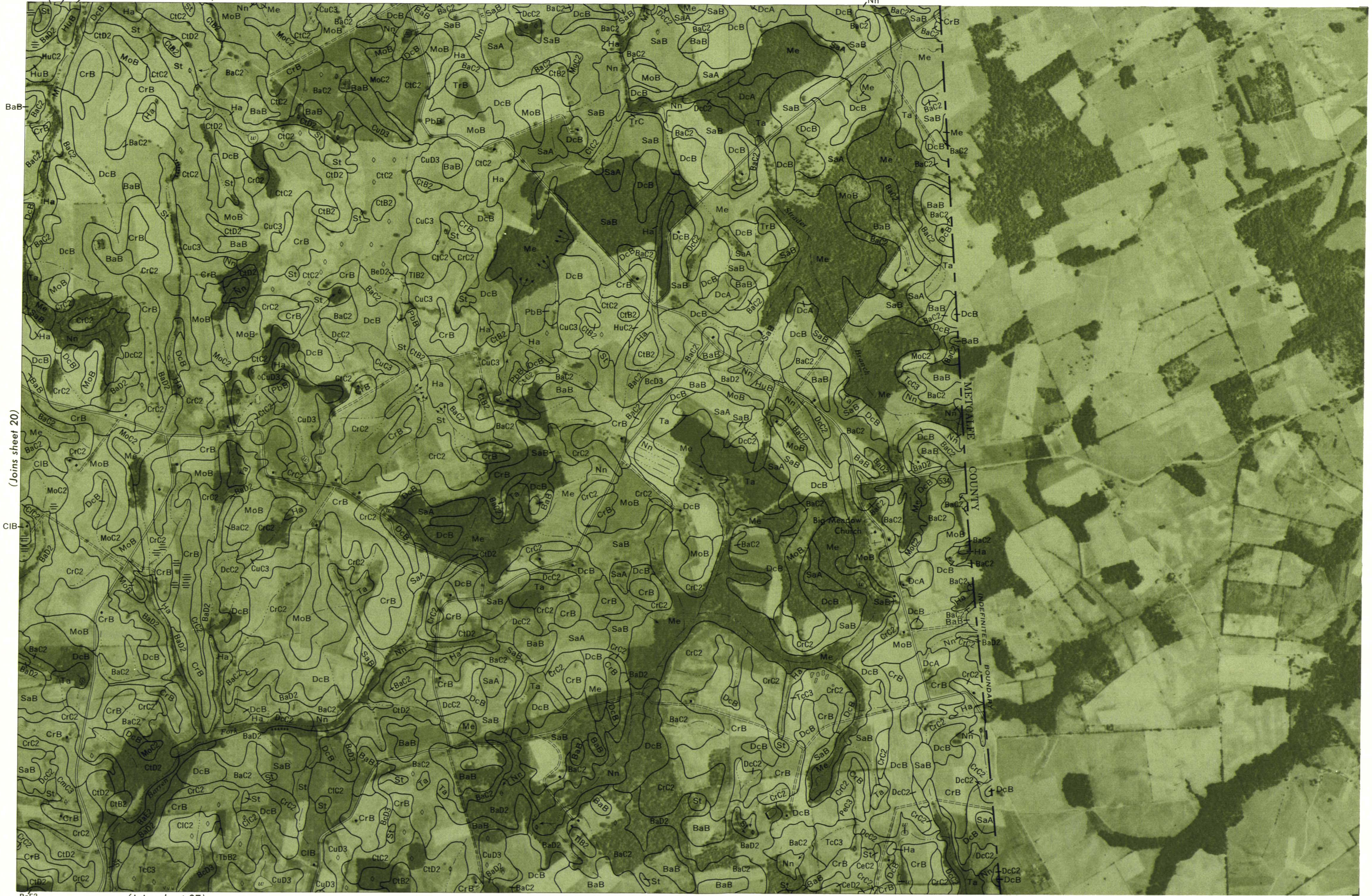
BARREN COUNTY, KENTUCKY NO. 19

BARREN COUNTY, KENTUCKY — SHEET NUMBER 20

BARREN COUNTY, KENTUCKY NO. 20

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 15)



(Joins sheet 20)

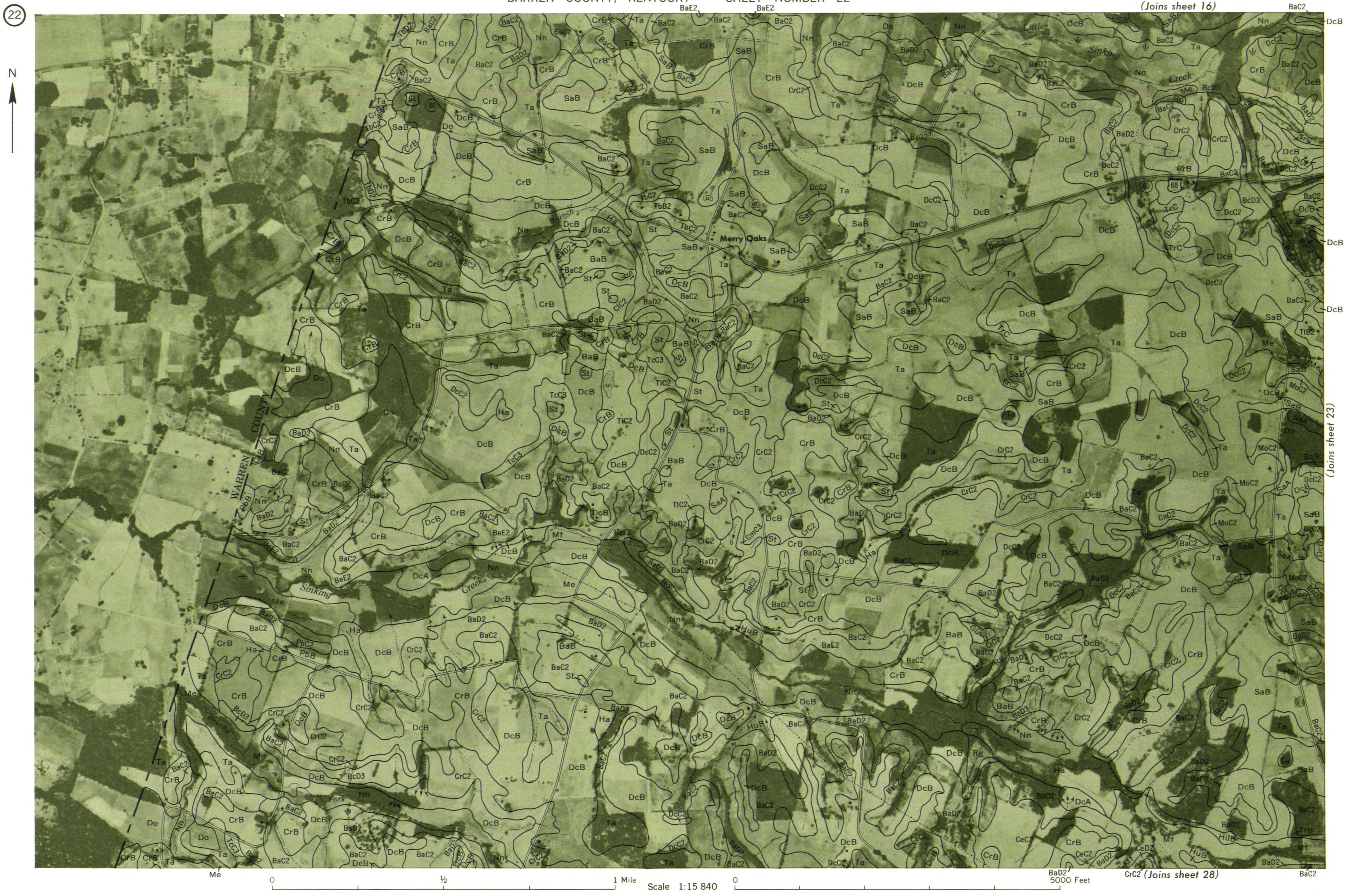
(Joins sheet 27)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

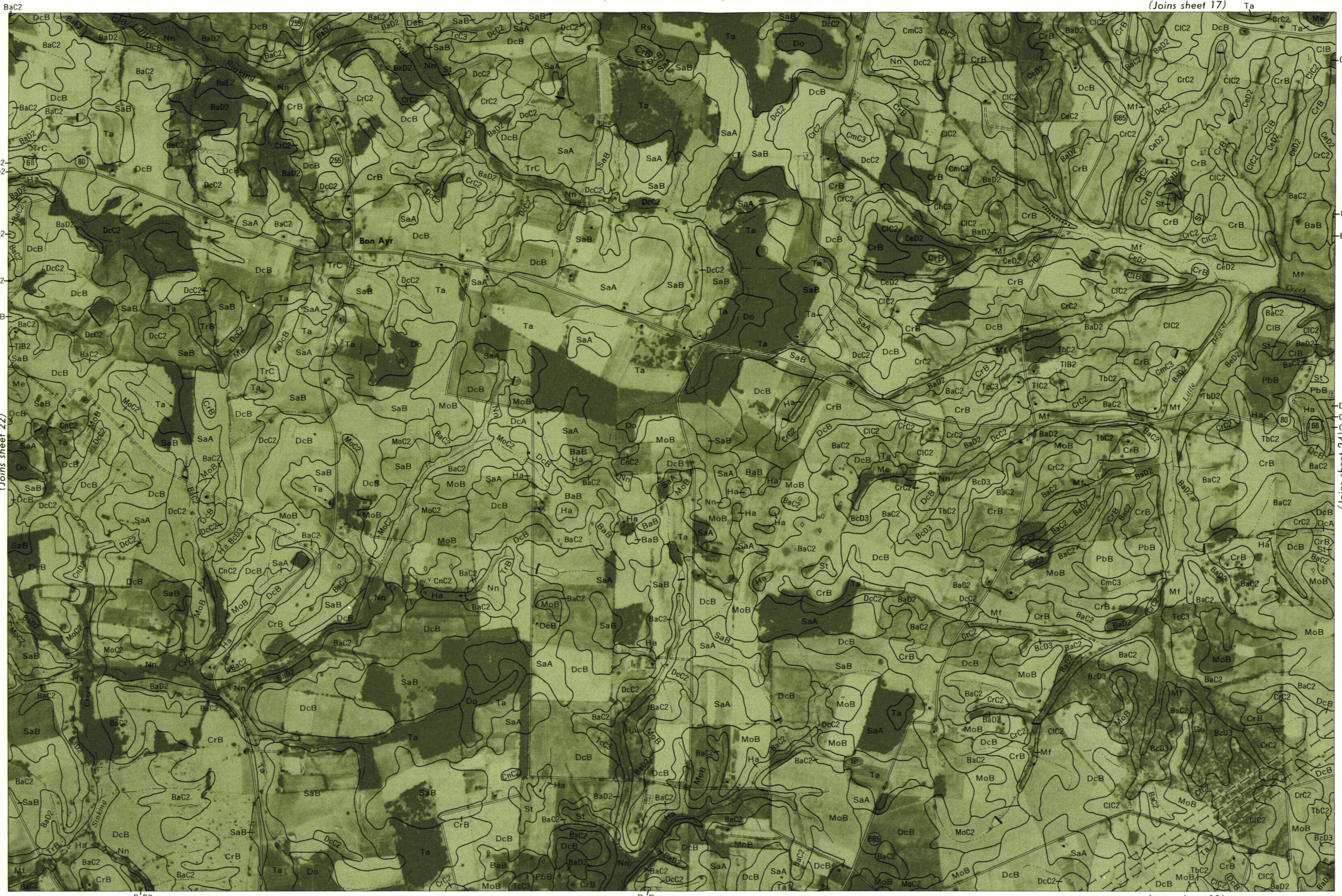
BARREN COUNTY, KENTUCKY NO. 21

(22)



BARREN COUNTY, KENTUCKY NO. 22

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



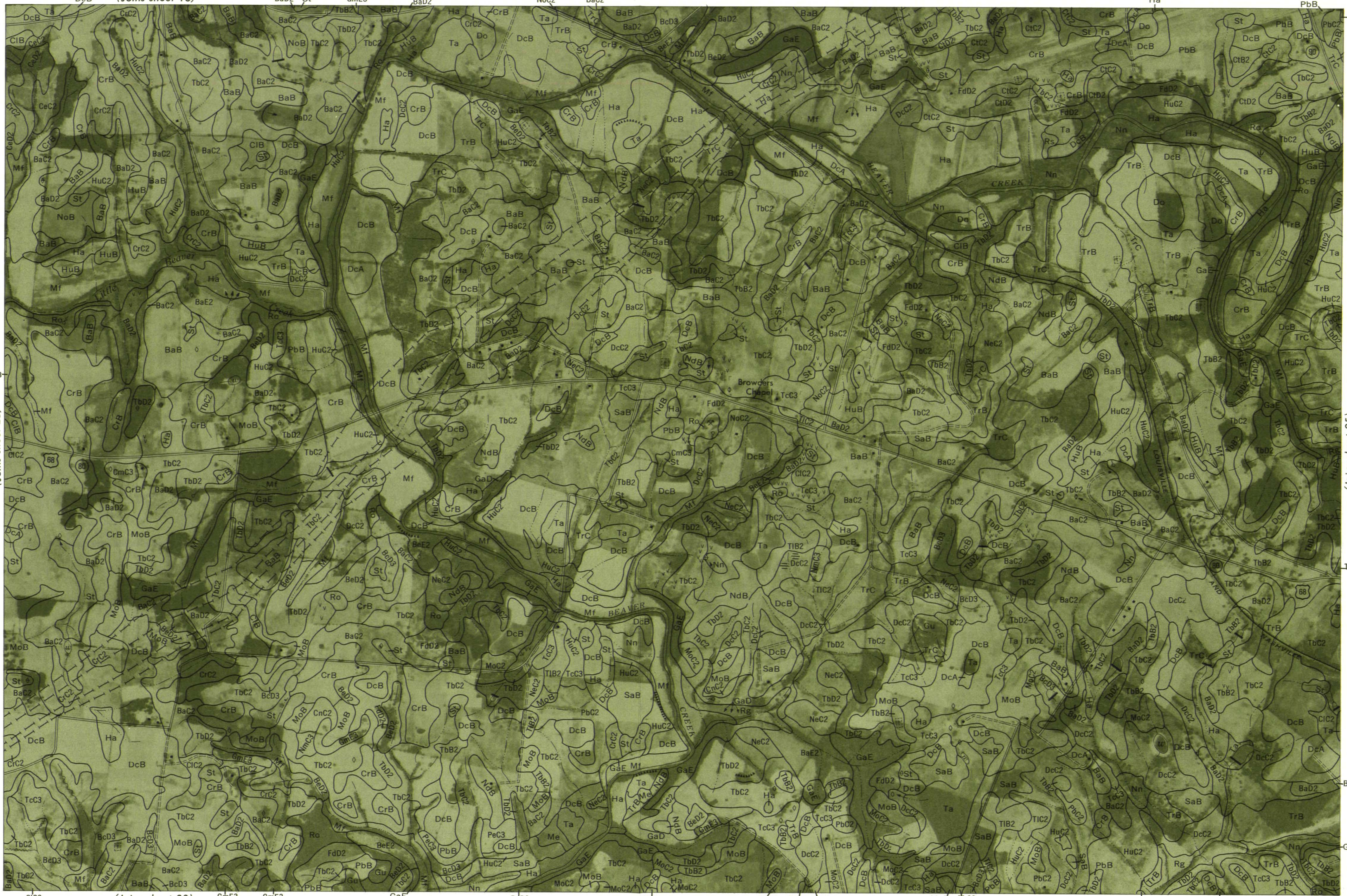
0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 23

BARREN COUNTY, KENTUCKY — SHEET NUMBER 24

(Joins sheet 18)



(Joins sheet 30)

Scale 1:15 840

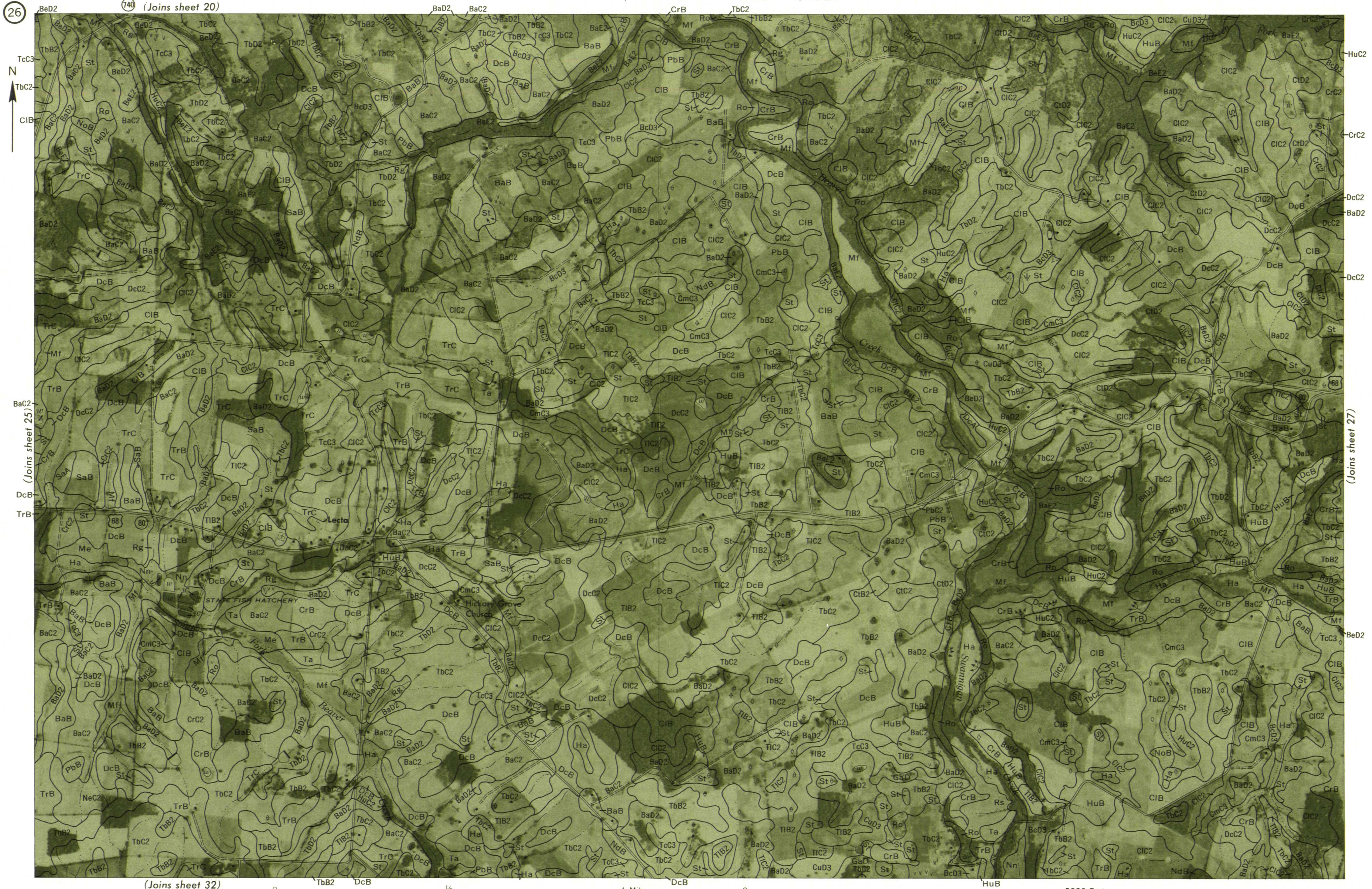
0 ½ 1 Mile

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 24

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



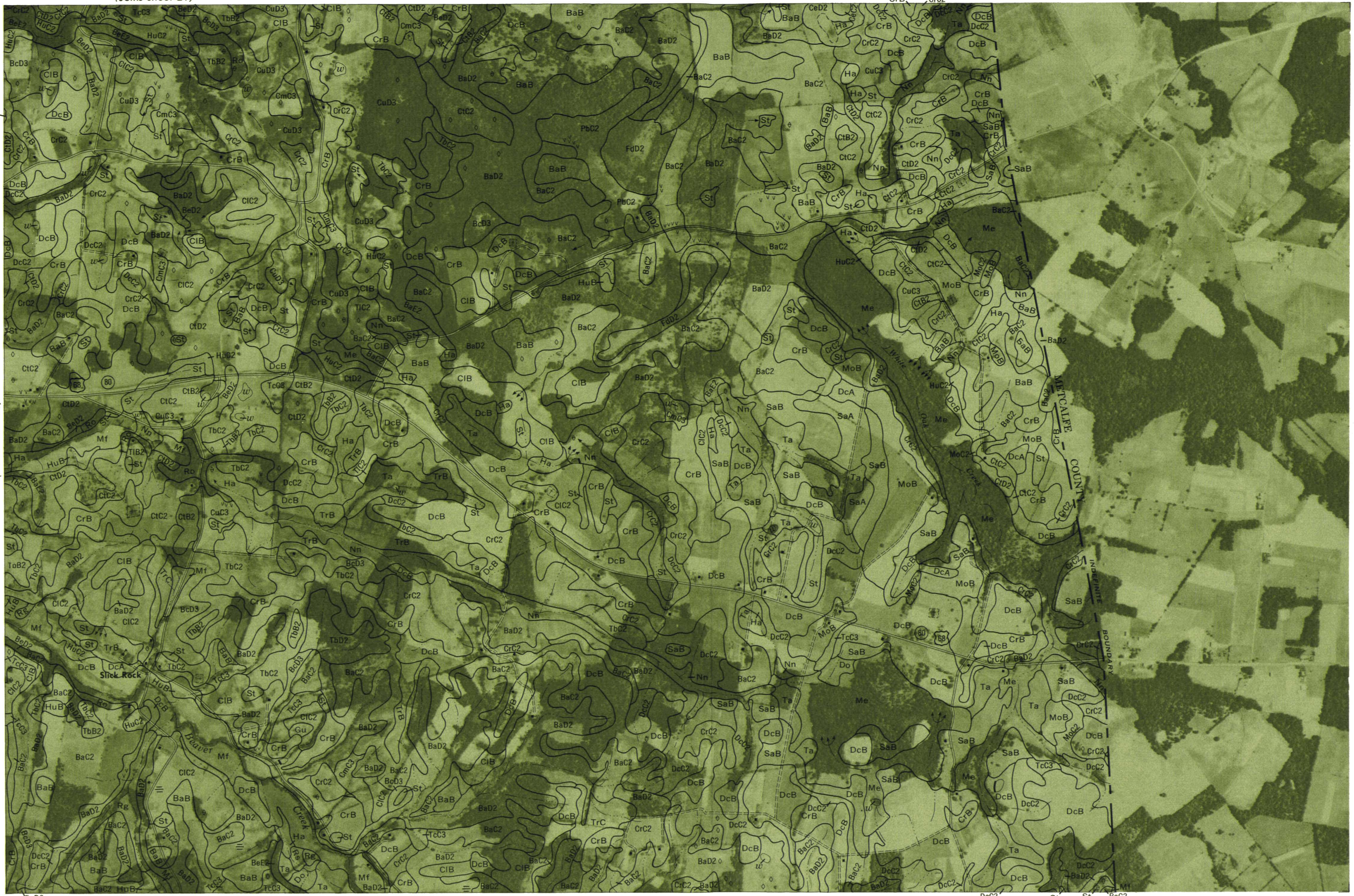
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 26

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 21)

(Joins sheet 26)

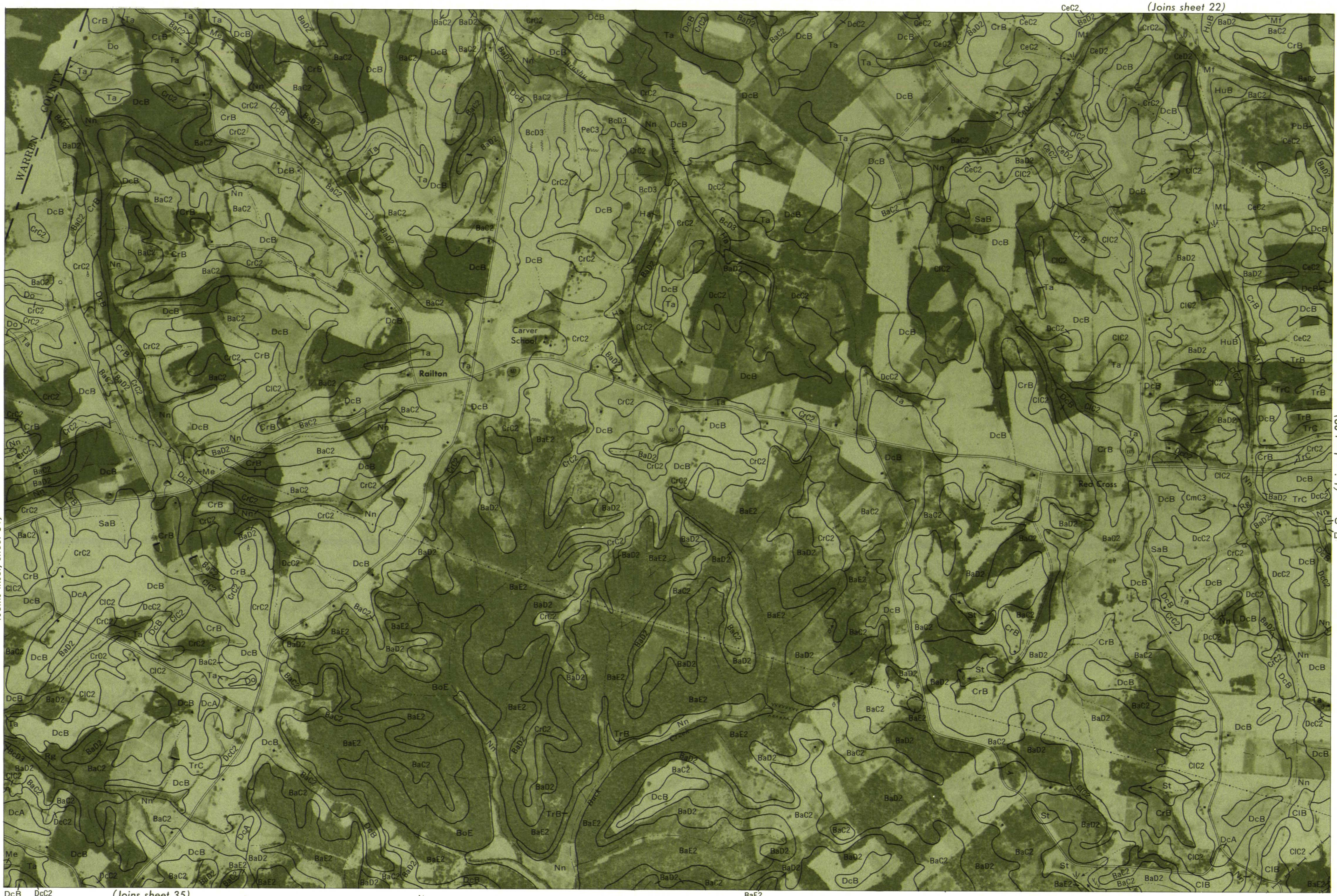


(Joins sheet 33)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 28



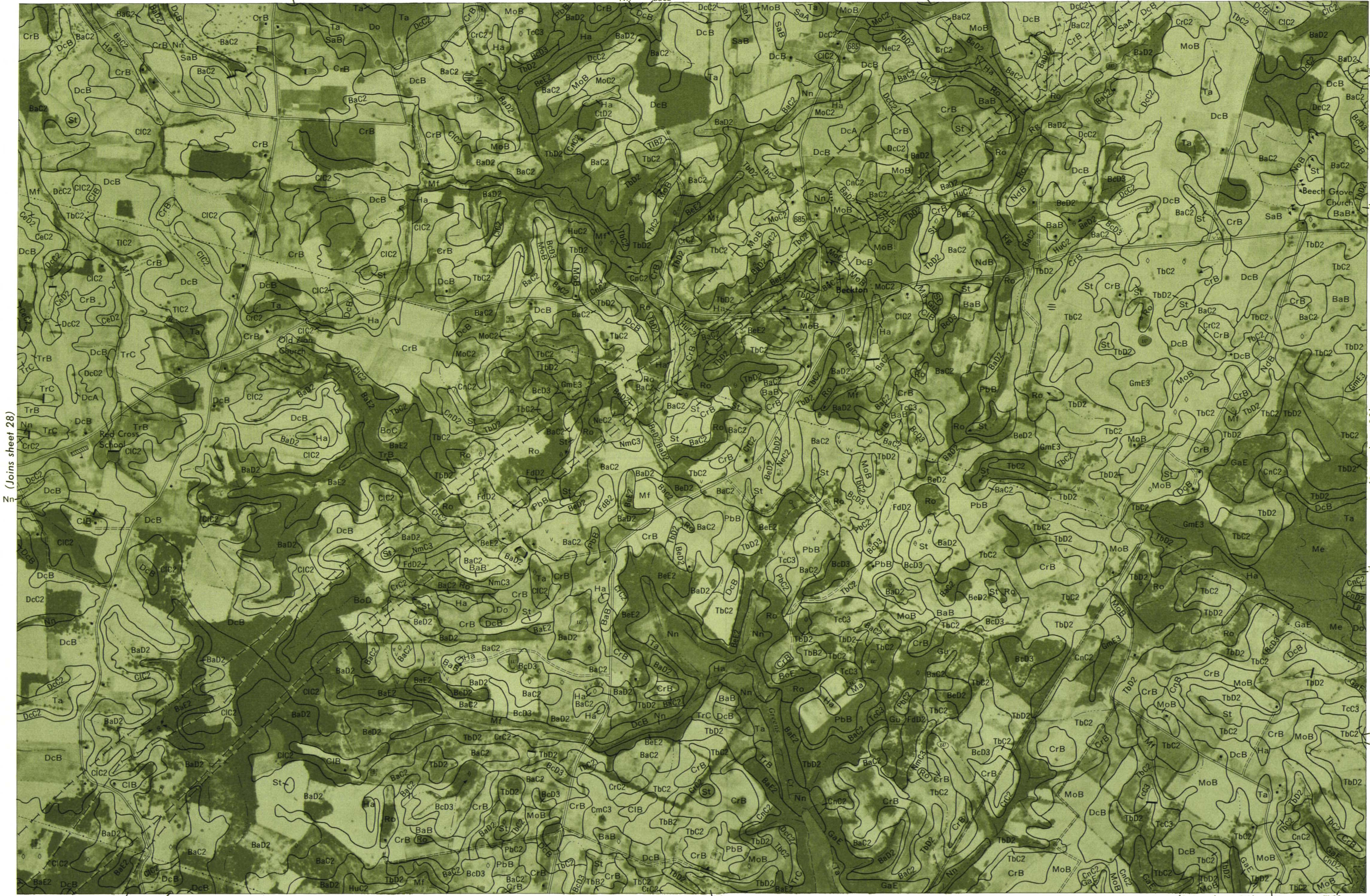
0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 28

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 23)

(Joins sheet 28)



(Joins sheet 30)

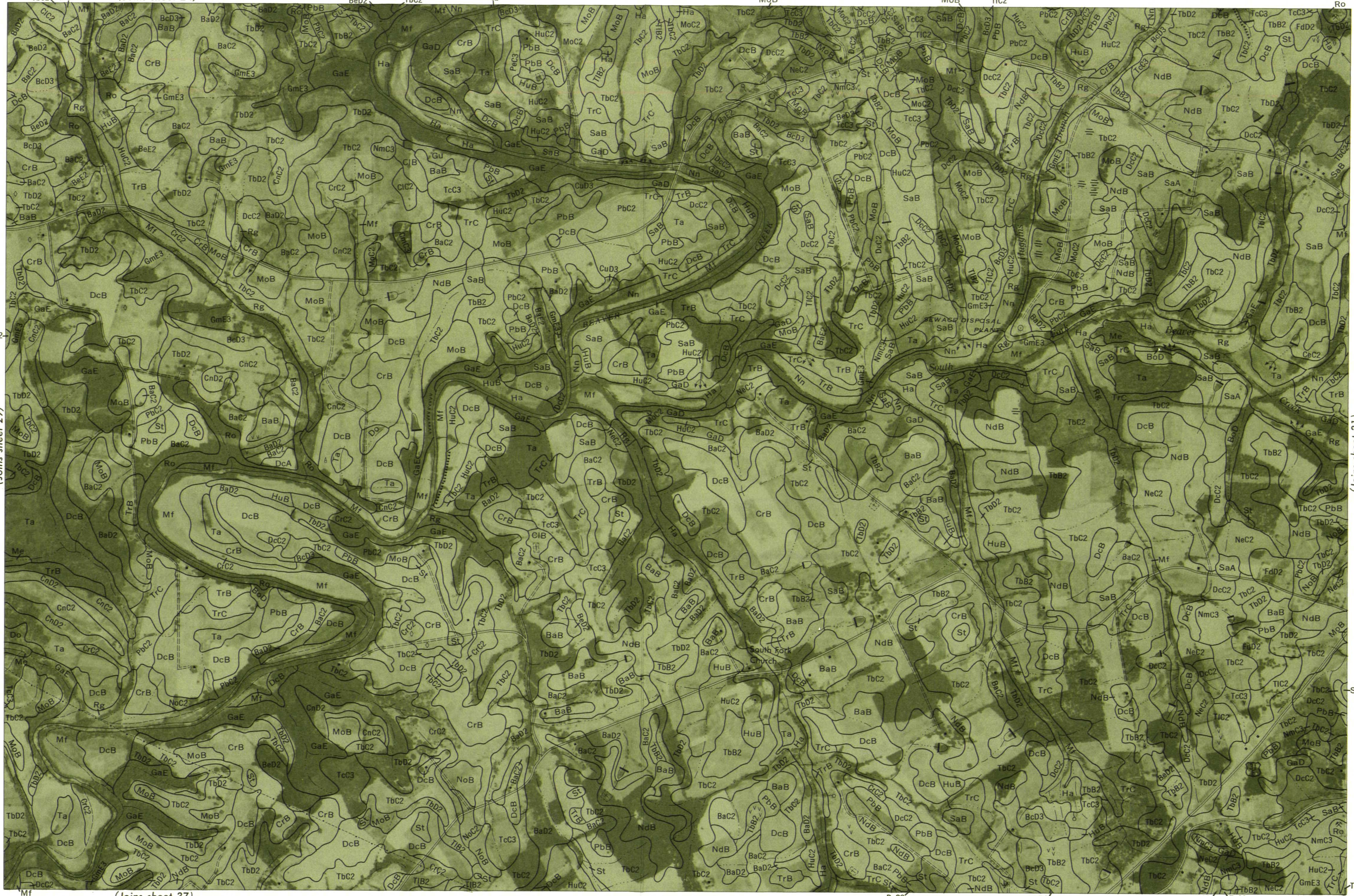
(Joins sheet 36)

0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 30

N



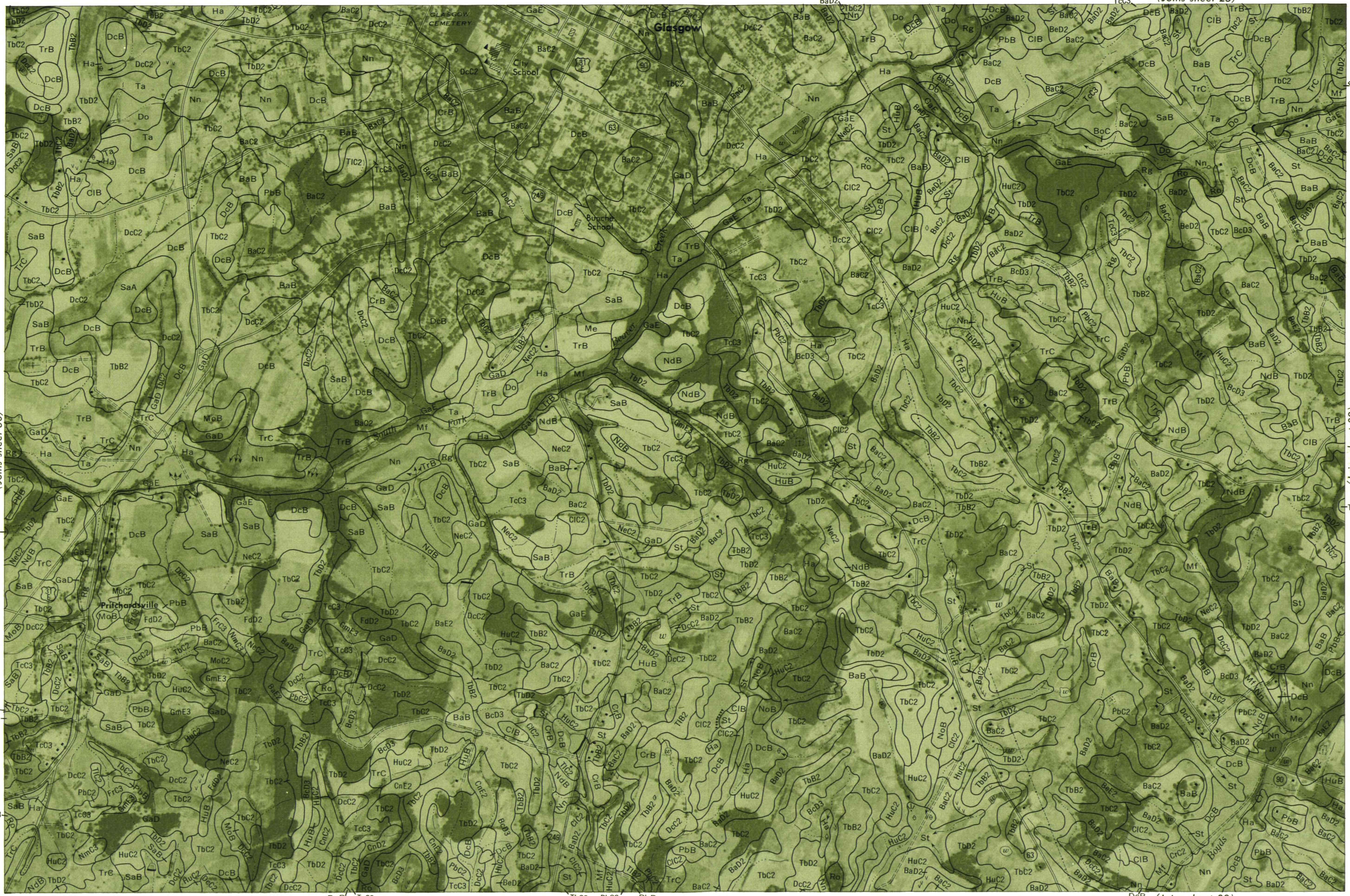
0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 30

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



Scale 1:15 840

0 ½ 1 Mile

0 5000 Feet

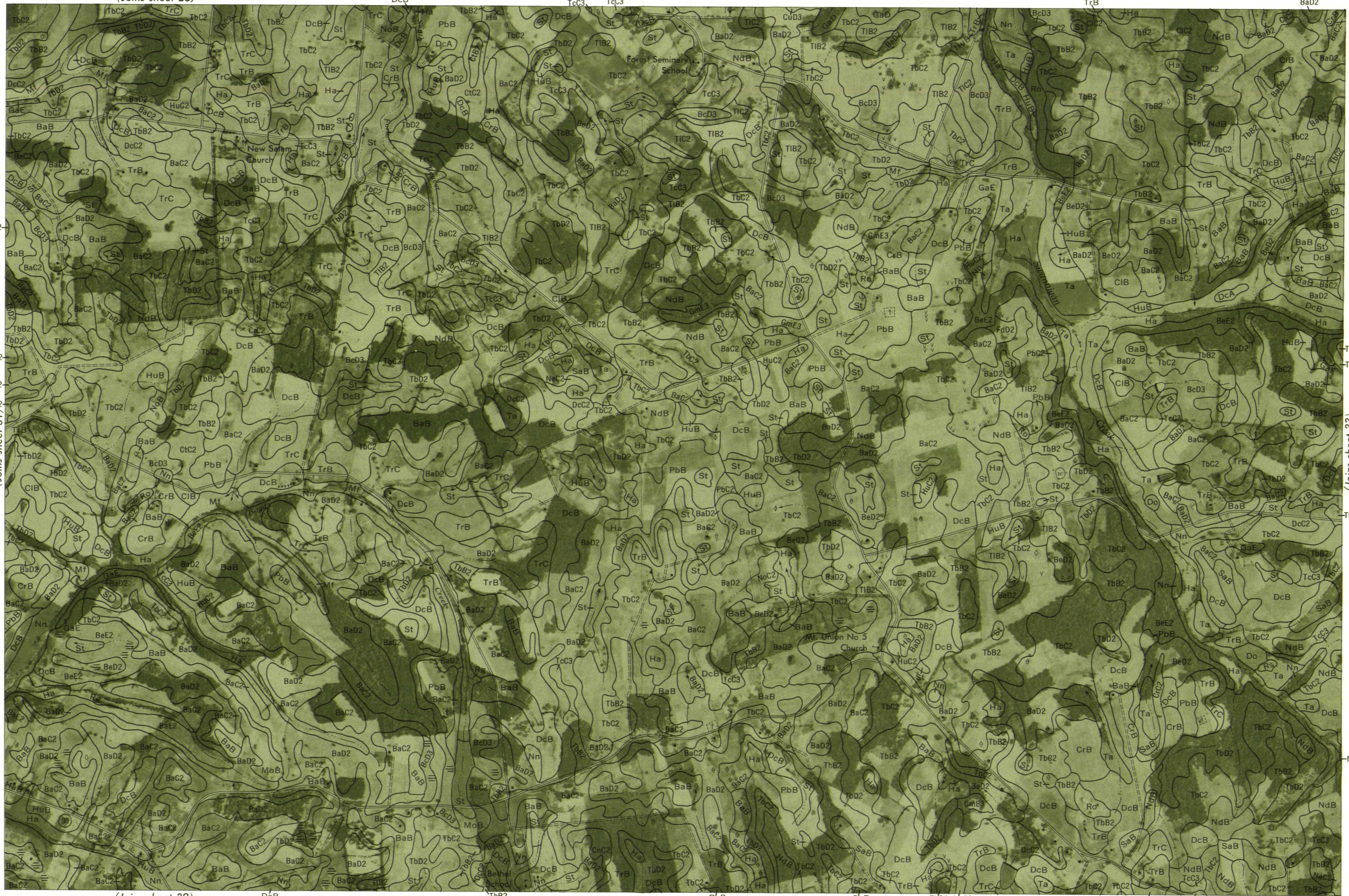
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 31

BARREN COUNTY, KENTUCKY — SHEET NUMBER 32

32

(Joins sheet 26)



(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 39)

0 ½ 1 Mile

Scale 1:15 840

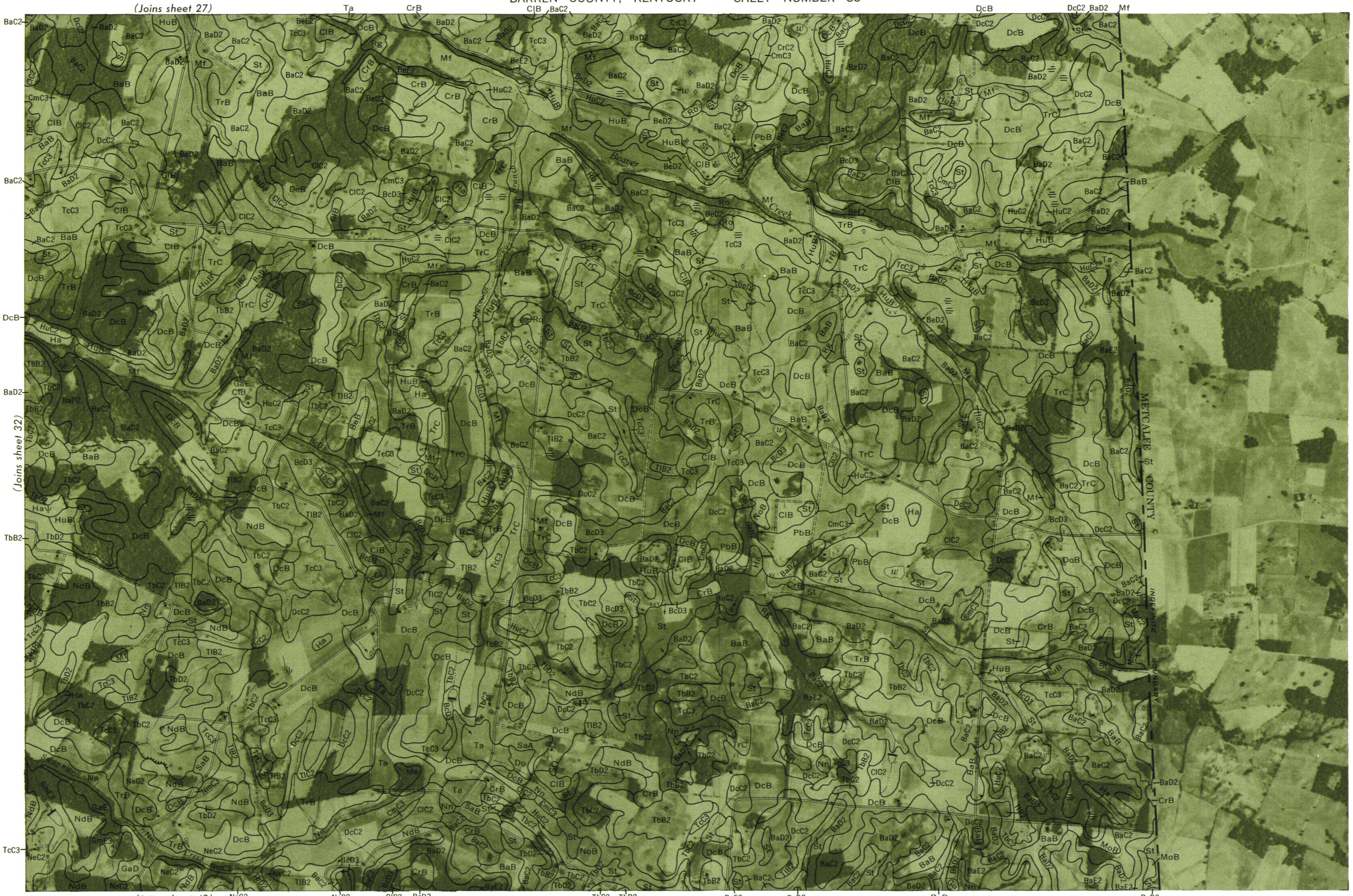
0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 32

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 27)

(Joins sheet 32)



(Joins sheet 40)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

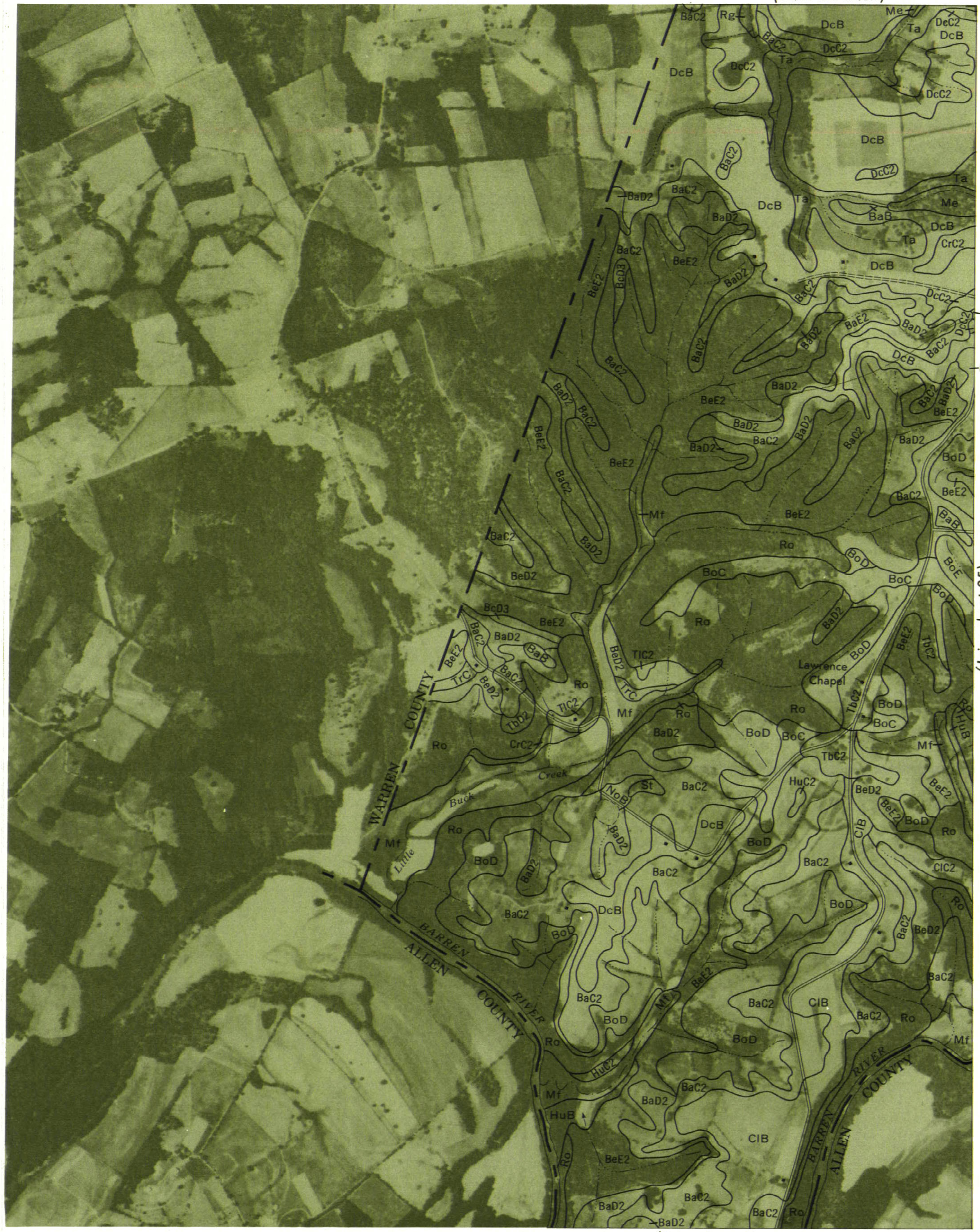
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

N

(Joins sheet 28)

(Joins upper right)

(Joins lower left)



(Joins sheet 35)

(Joins sheet 41)

0 ½ 1 Mile

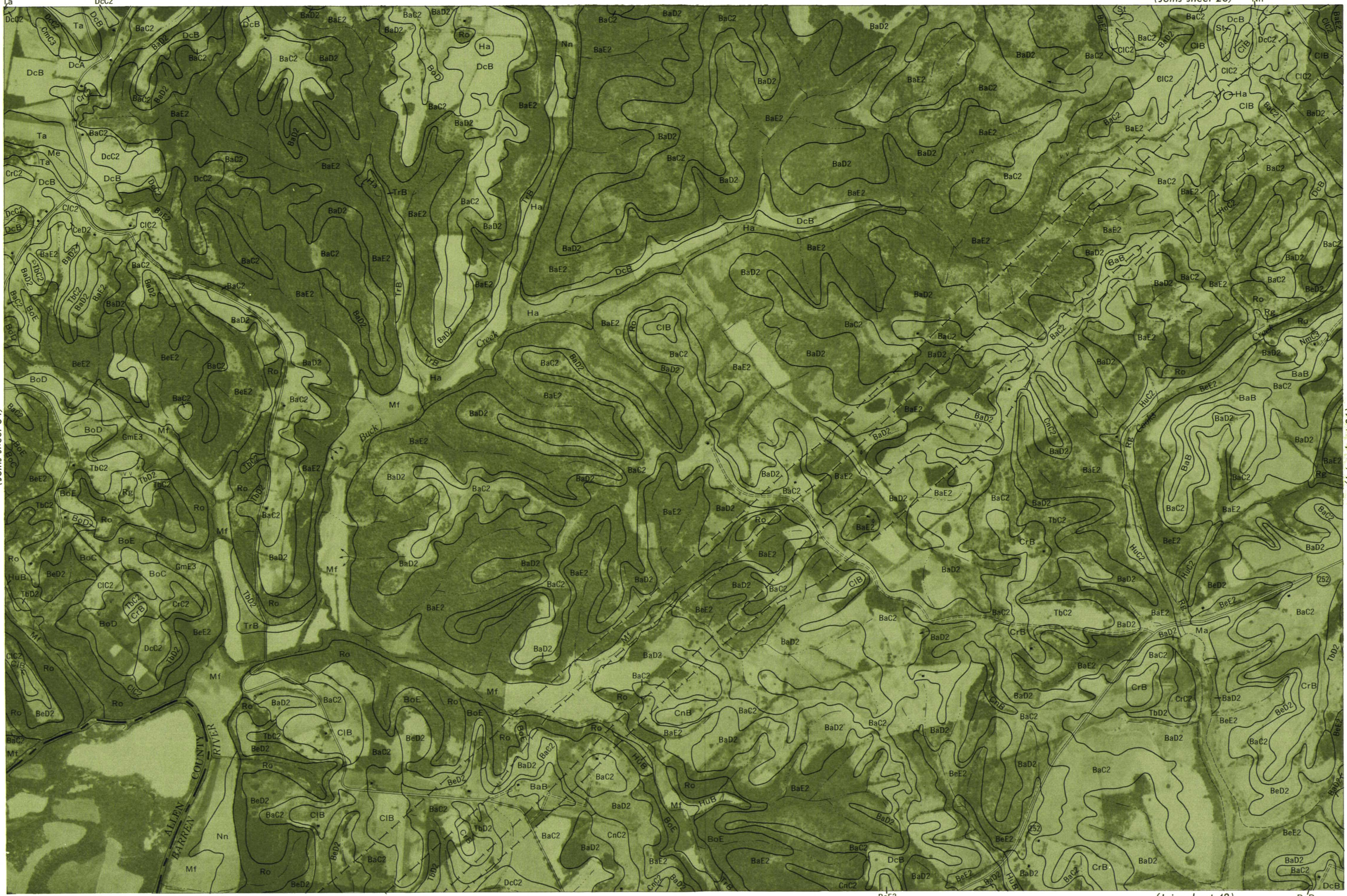
Scale 1:15 840

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 34

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

35



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 36

(Joins sheet 29)

N

(Joins sheet 35)

(Joins sheet 37)

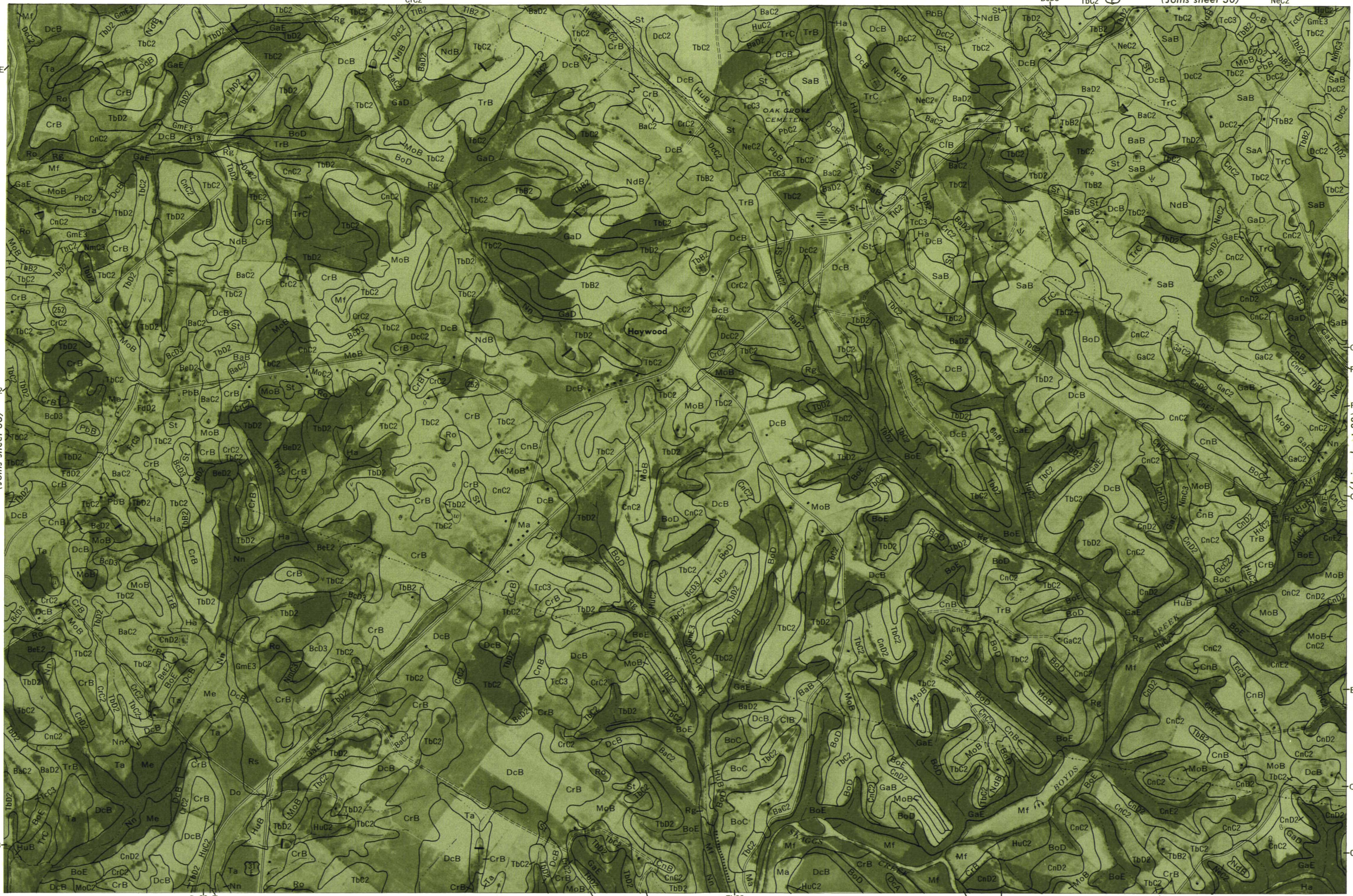
(Joins sheet 43)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 36

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 30)



(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 44)

0 ½ 1 Mile

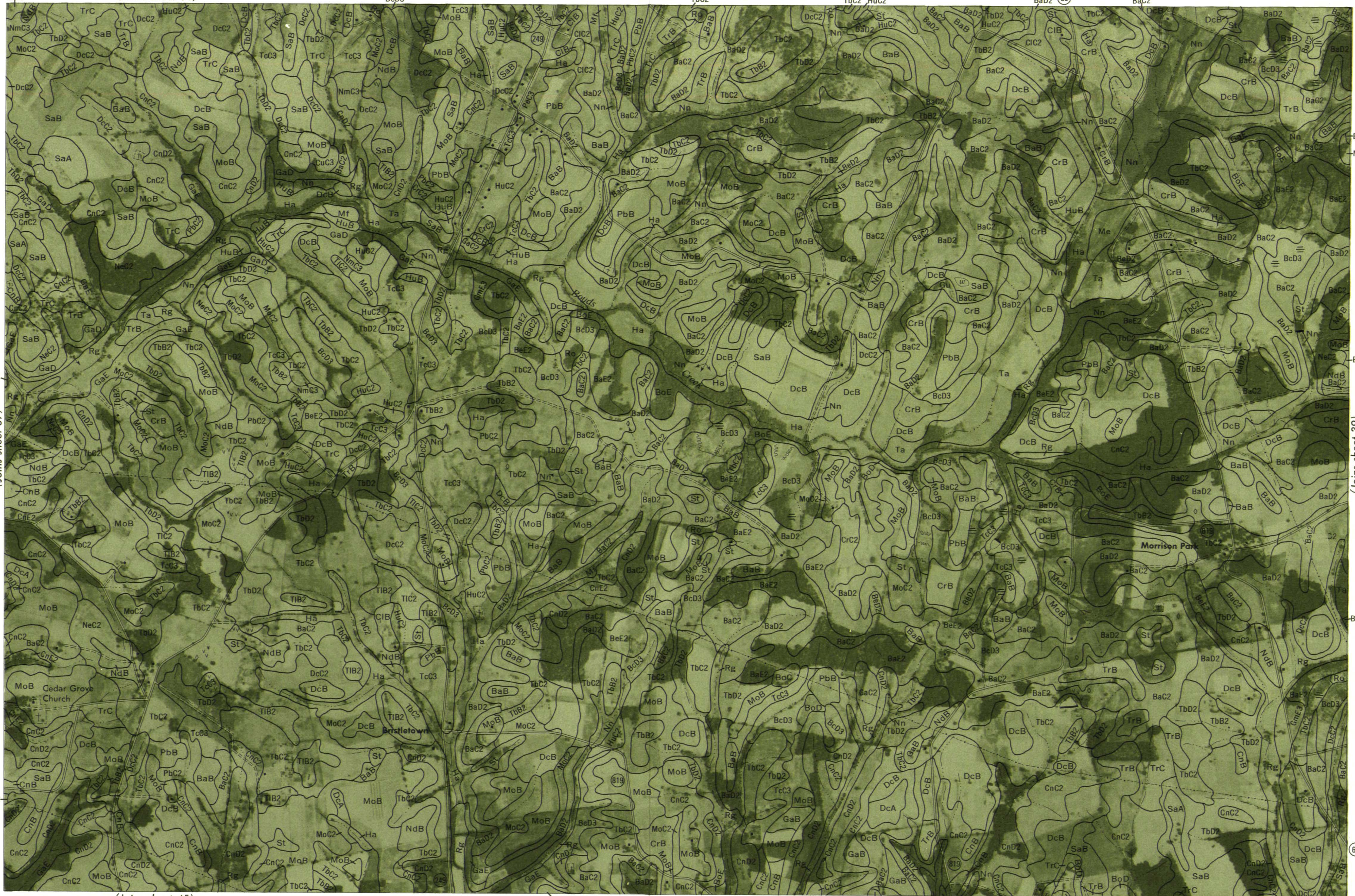
Scale 1:15 840

0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

38

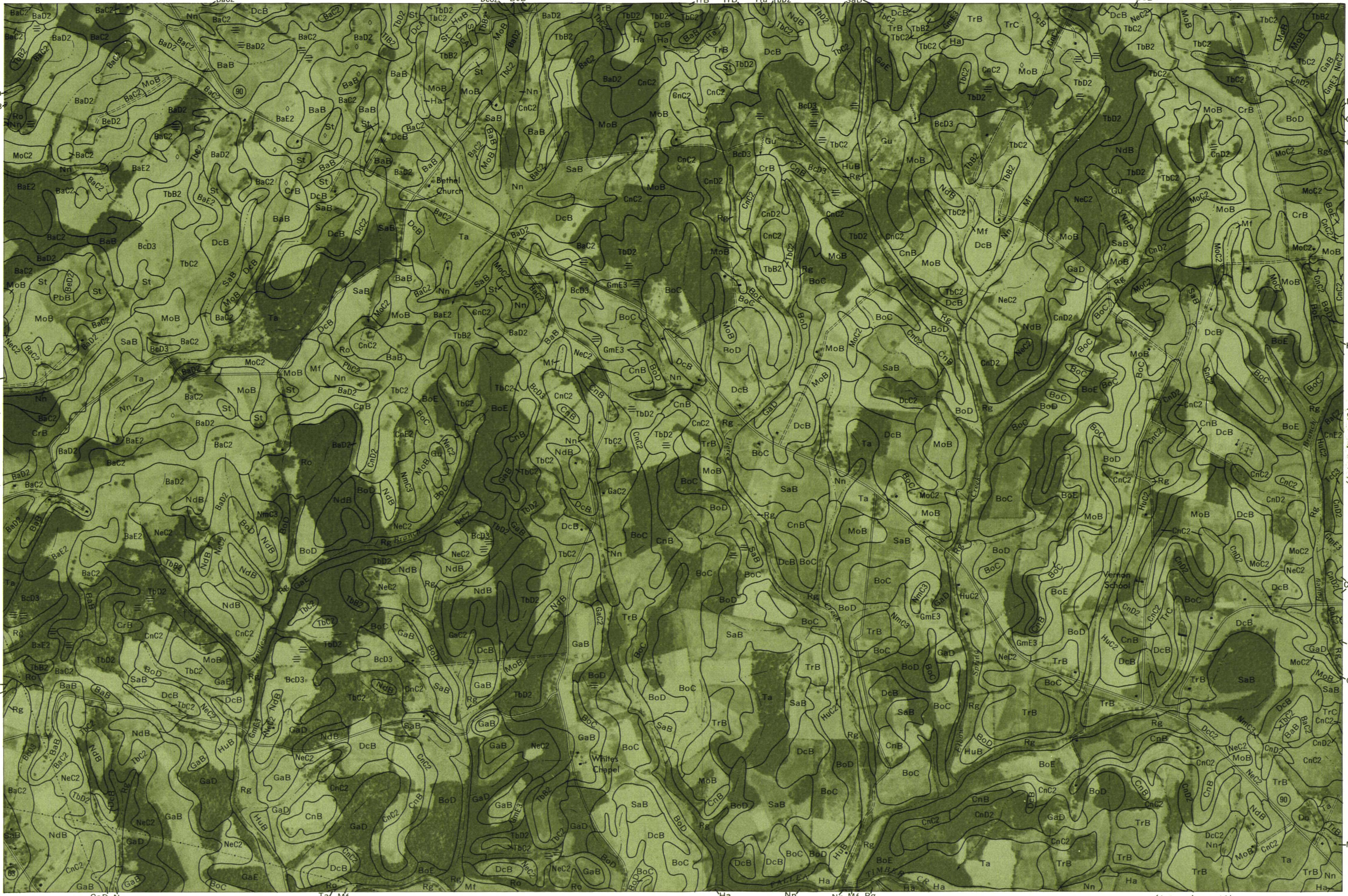
BARREN COUNTY, KENTUCKY — SHEET NUMBER 38



0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 38

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

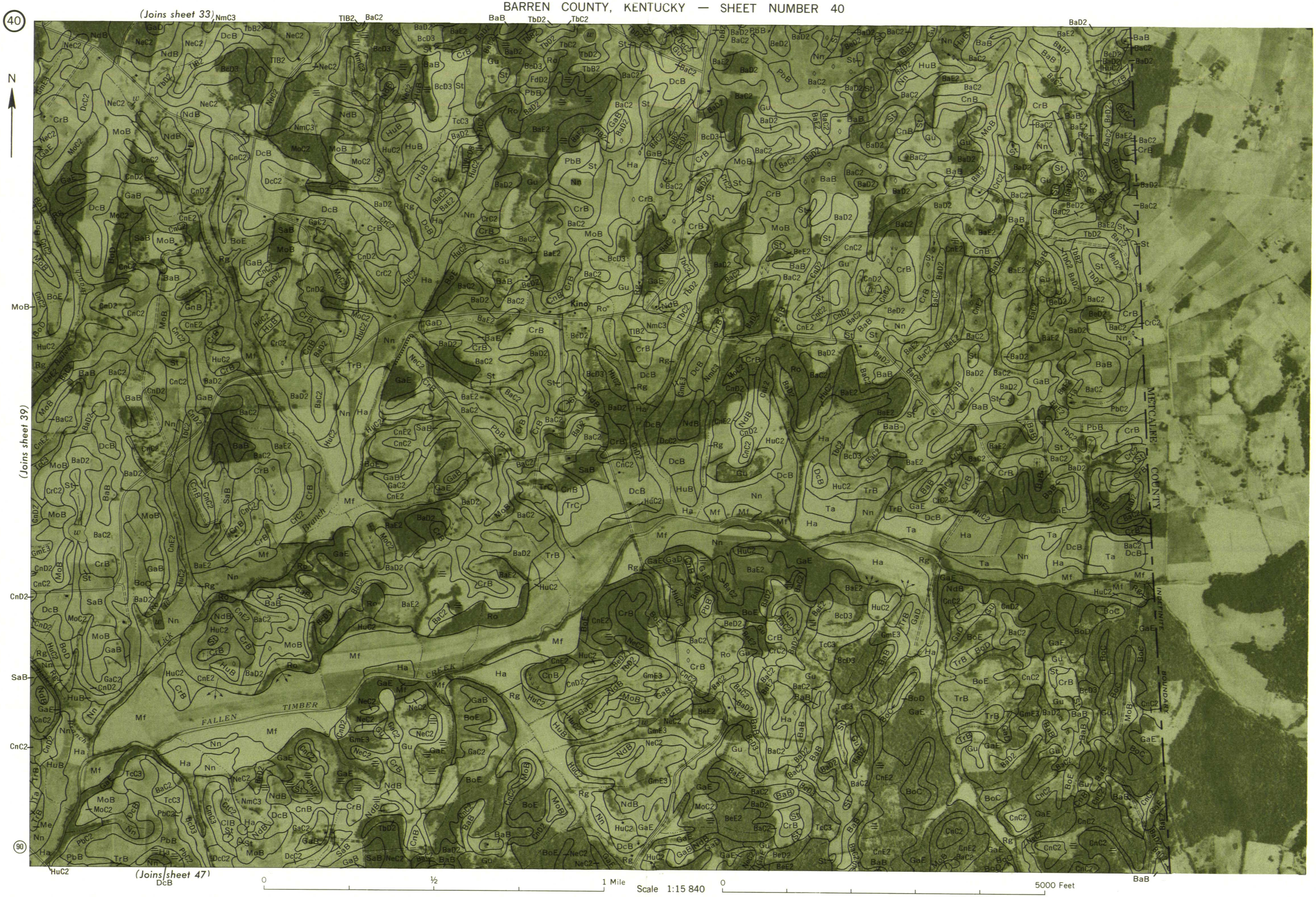


Scale 1:15 840

0 ½ 1 Mile

0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

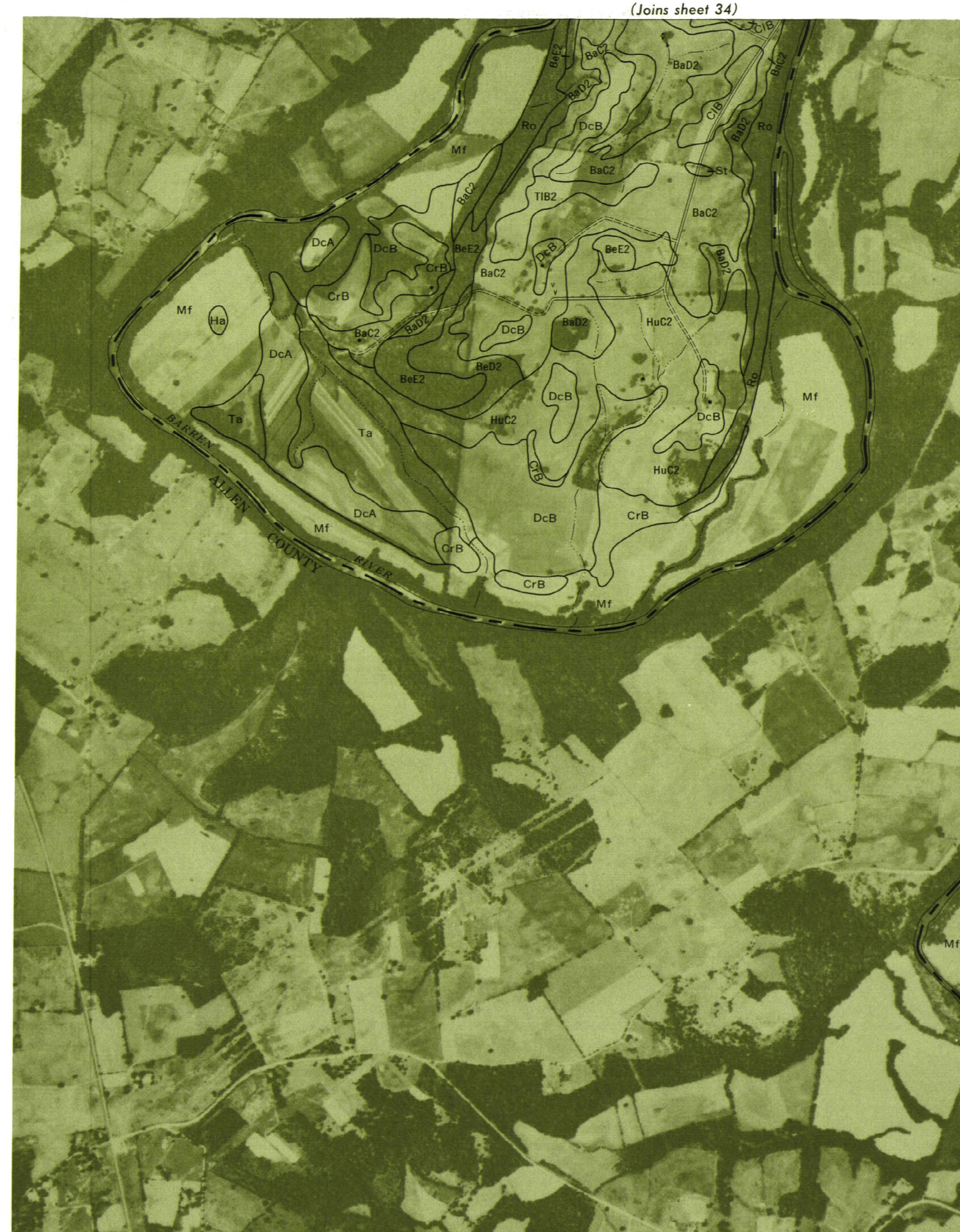
BARREN COUNTY, KENTUCKY NO. 40

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

41

BARREN COUNTY, KENTUCKY NO. 41

(Joins sheet 34)



(Joins sheet 42)

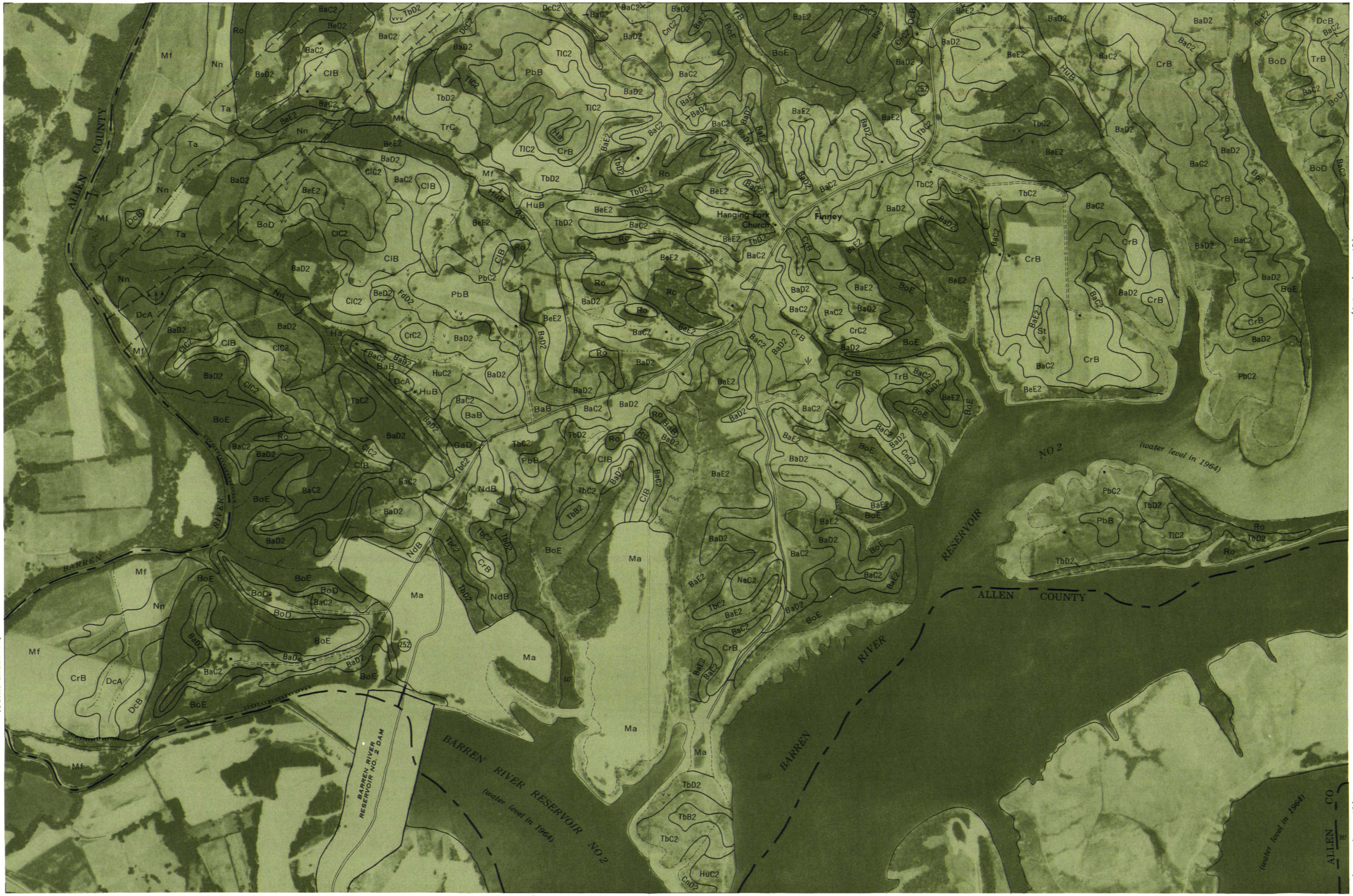
N

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

(42)

(Joins sheet 35)

(Joins sheet 41)



(Joins sheet 43)

(Joins sheet 43)

(Joins sheet 48)

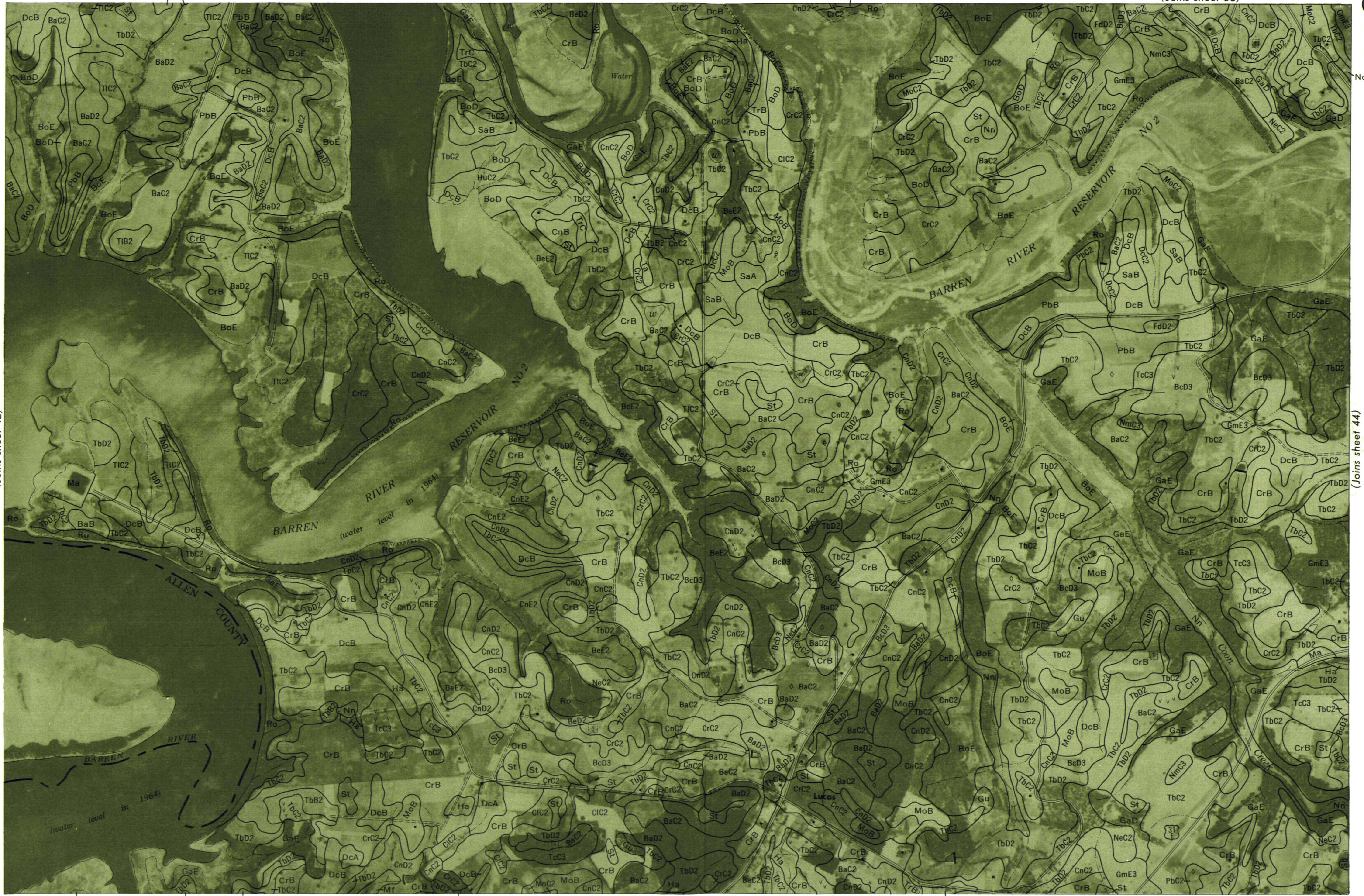
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 42

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station

(Joins sheet 36)

(Joins sheet 42)



(Joins sheet 44)

(Joins sheet 49)

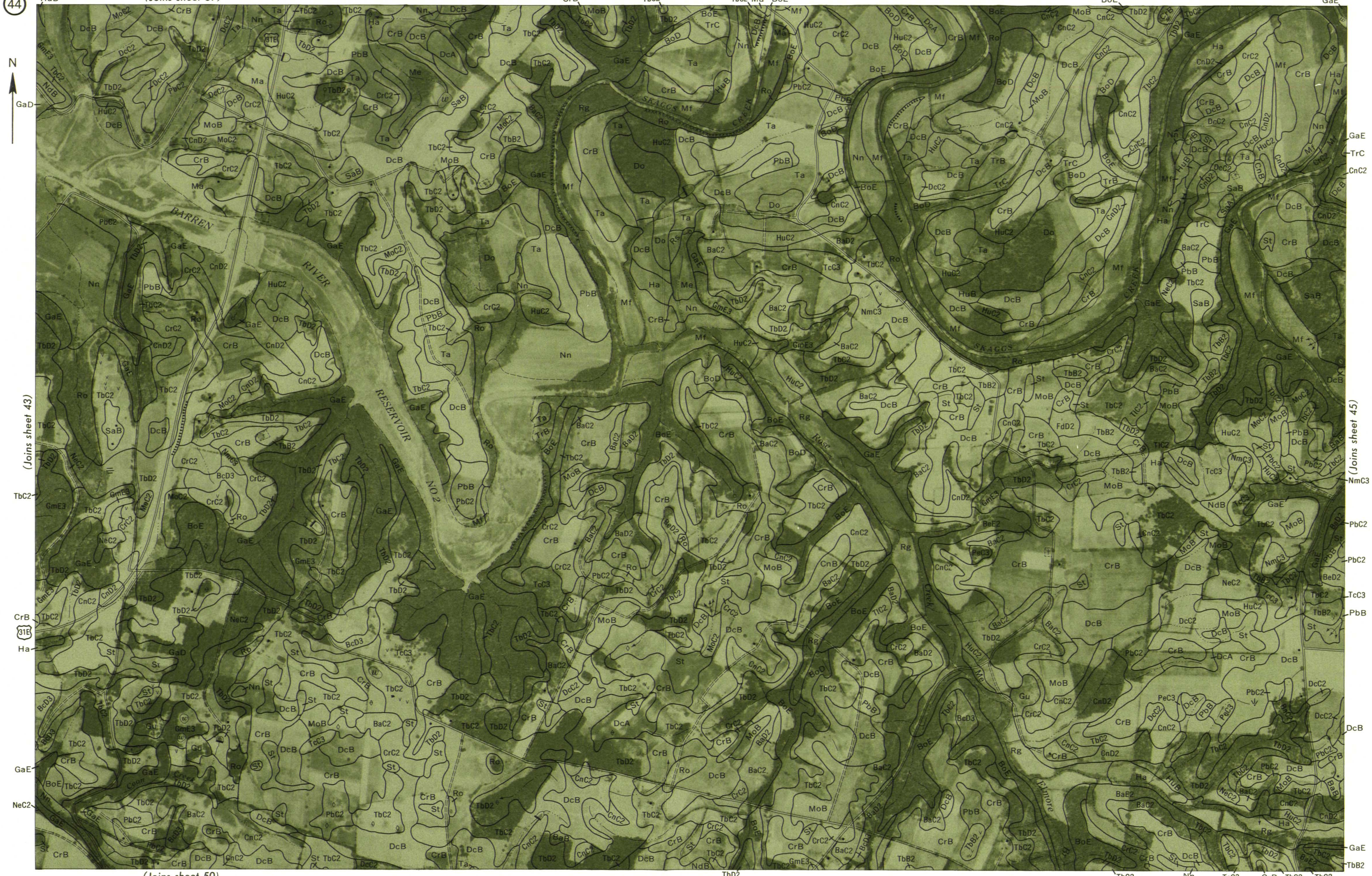
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 44

44

(Joins sheet 37)



(Joins sheet 50)

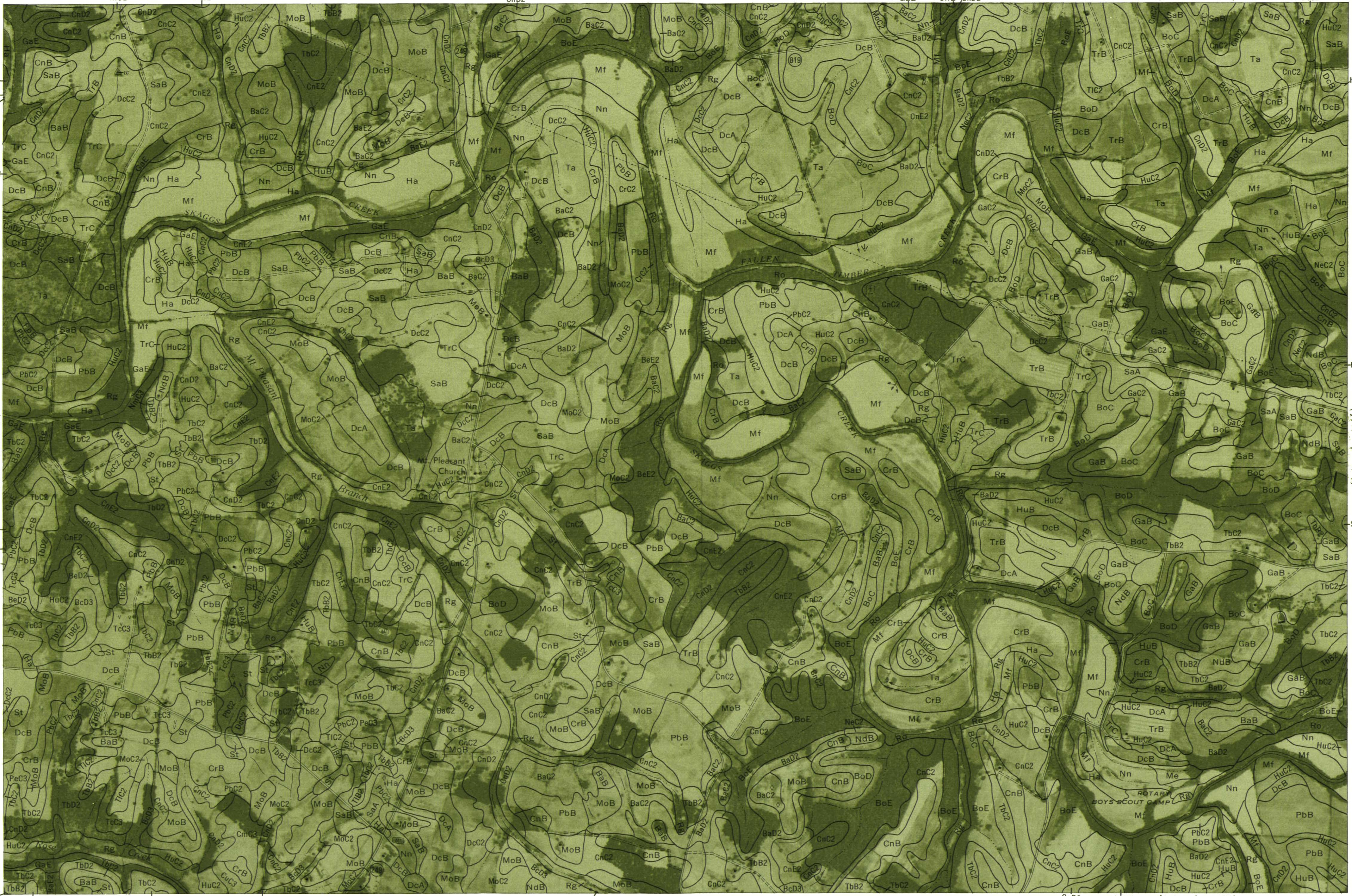
0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 44

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

45

(Joins sheet 38)



(Joins sheet 44)

(Joins sheet 46)

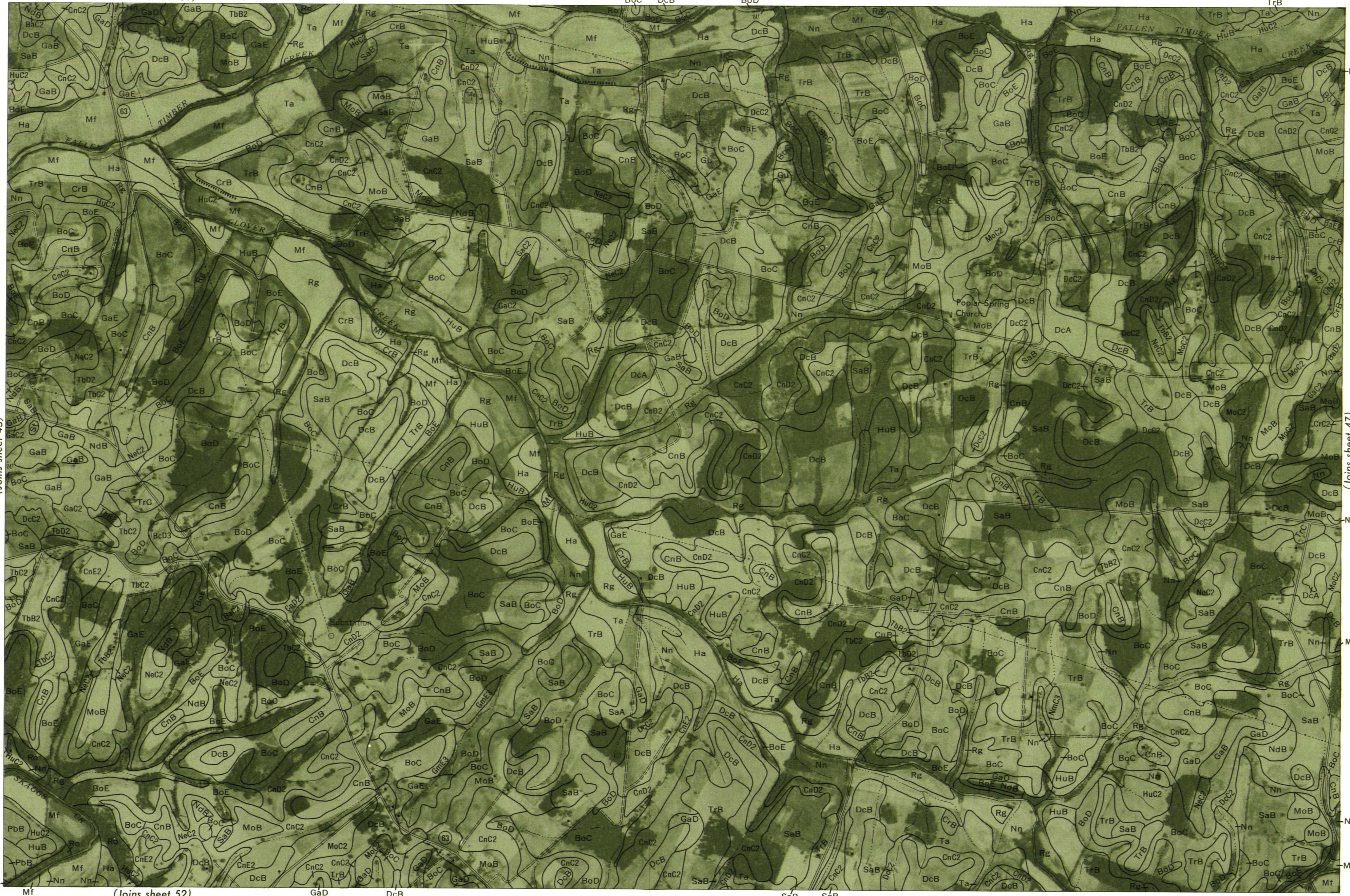
(Joins sheet 51)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 45

BARREN COUNTY, KENTUCKY — SHEET NUMBER 46



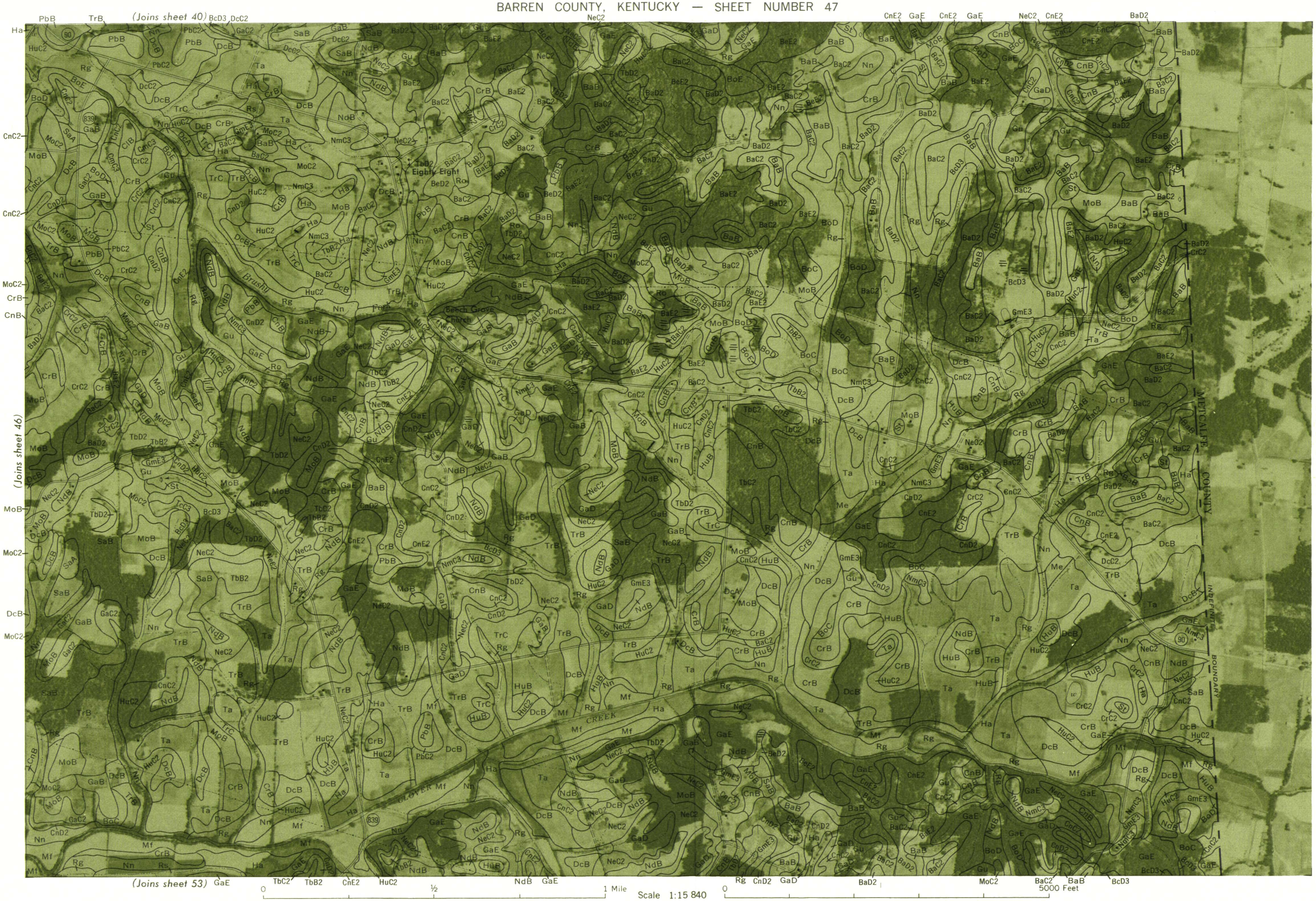
Scale 1:15 840

0 ½ 1 Mile

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 46

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



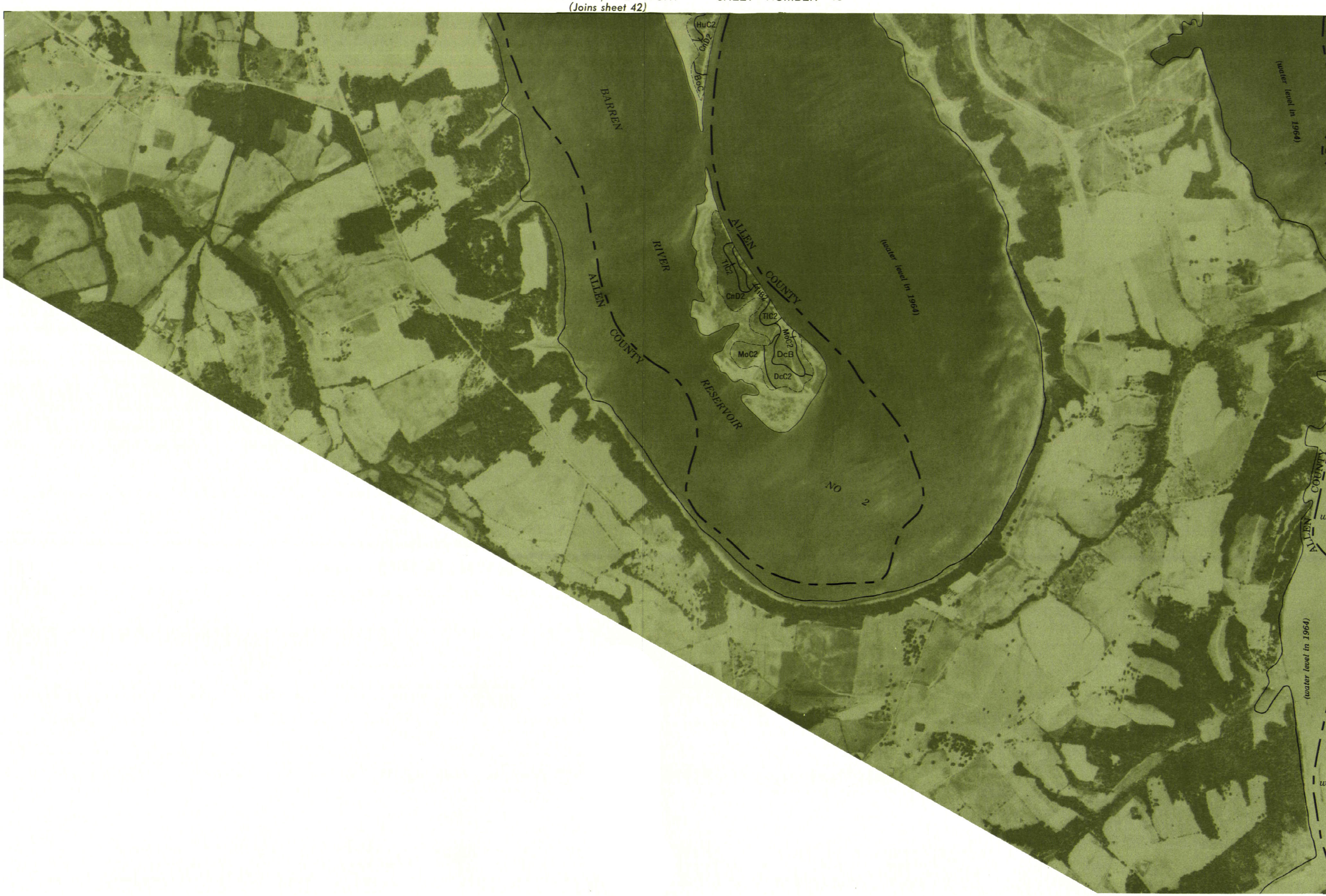
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 47

48

BARREN COUNTY, KENTUCKY — SHEET NUMBER 48
(Joins sheet 42)

N



(Joins sheet 49)

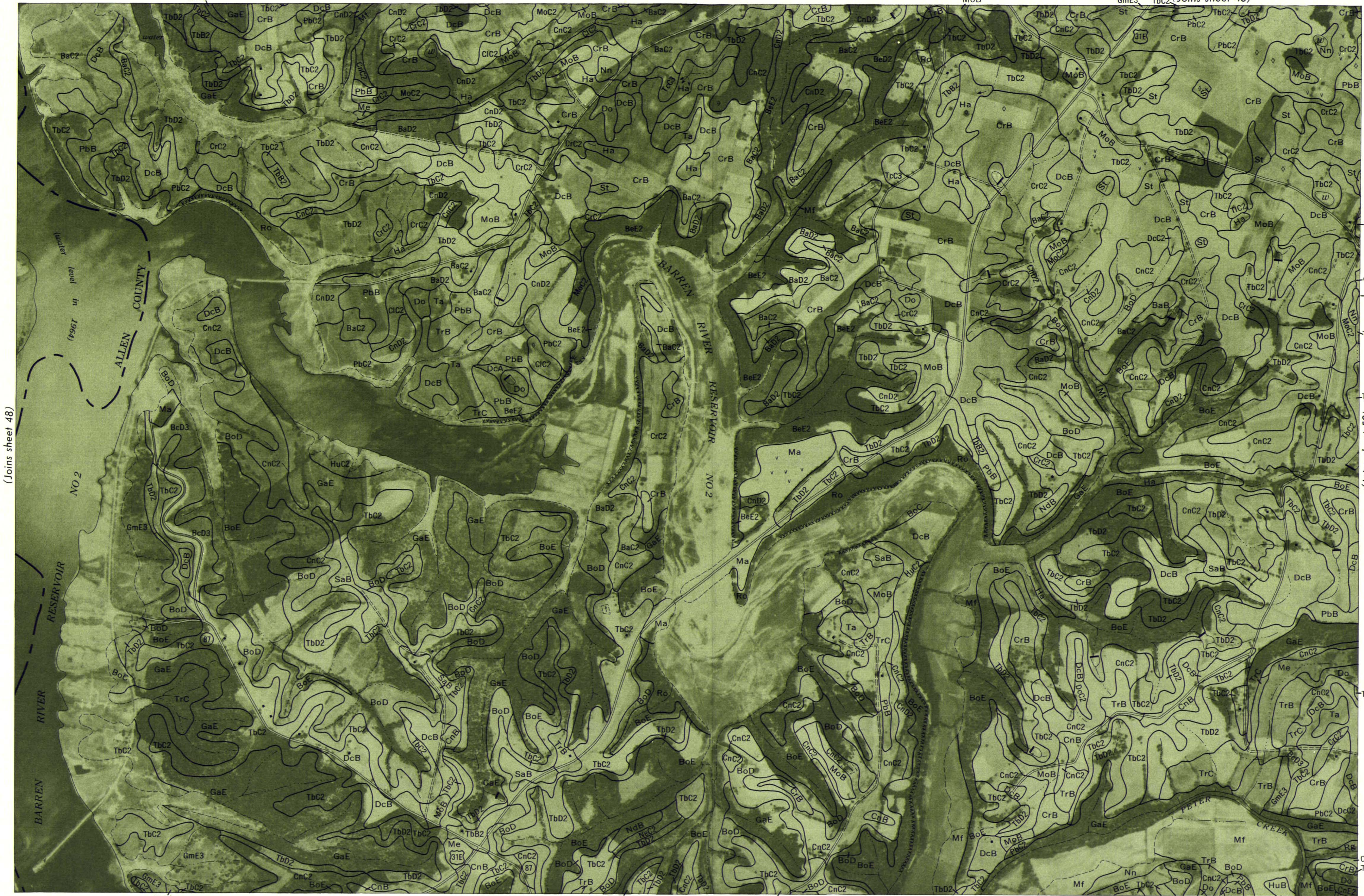
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 48

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 43)

(Joins sheet 48)



(Joins sheet 50)

(Joins sheet 54)

Scale 1:15 840

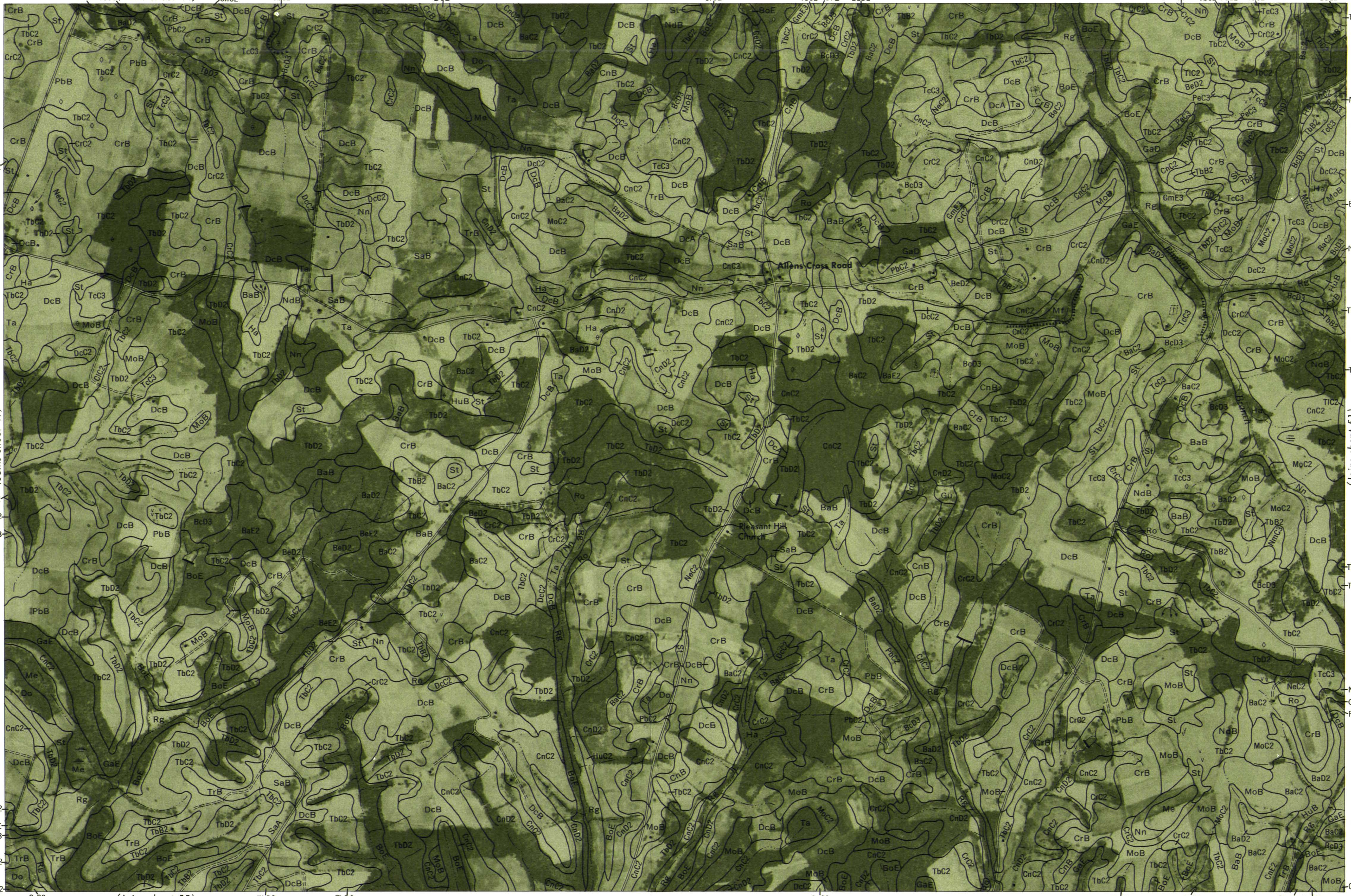
0 ½ 1 Mile

0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 49

50

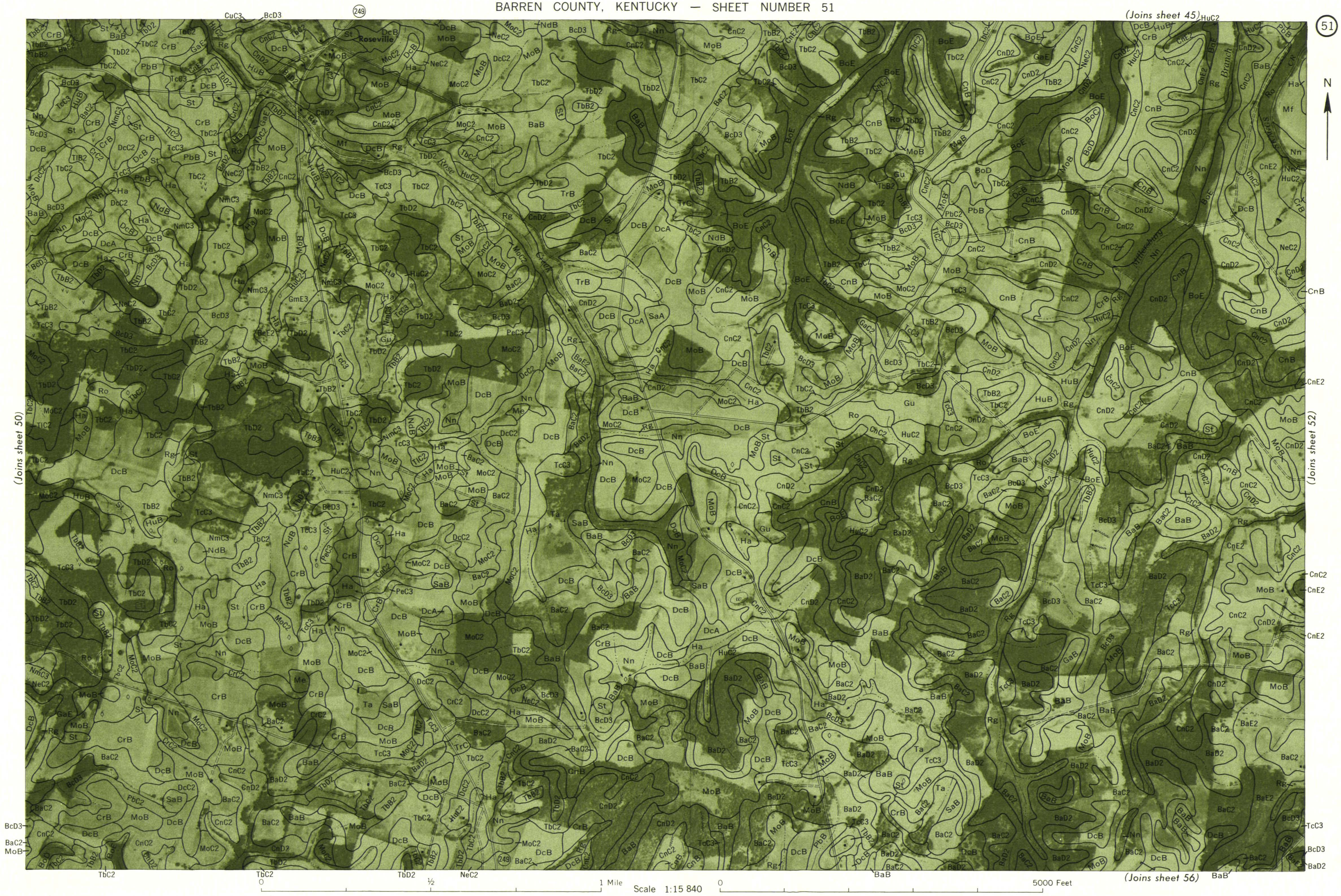


0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 50

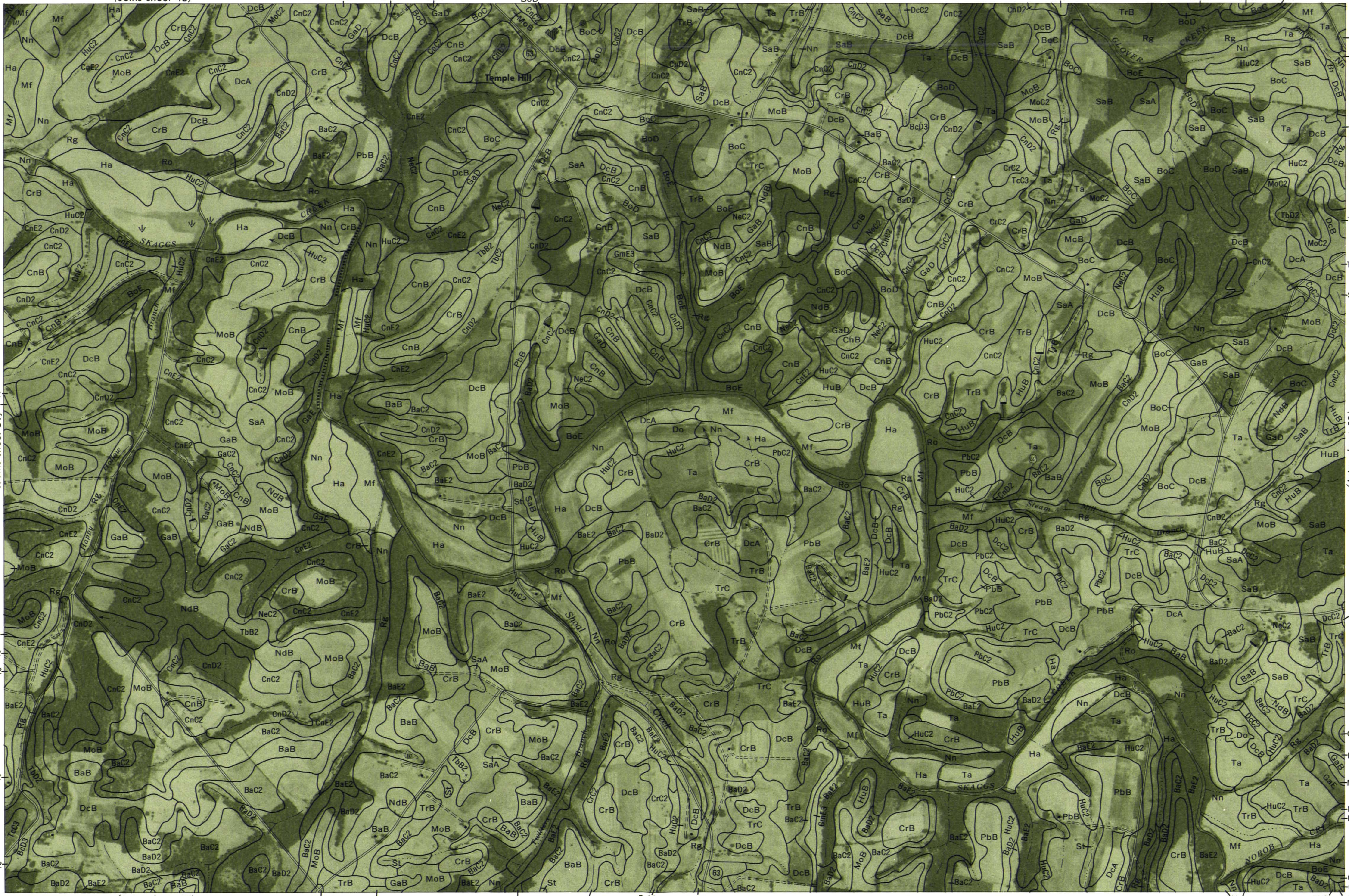
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 51



This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

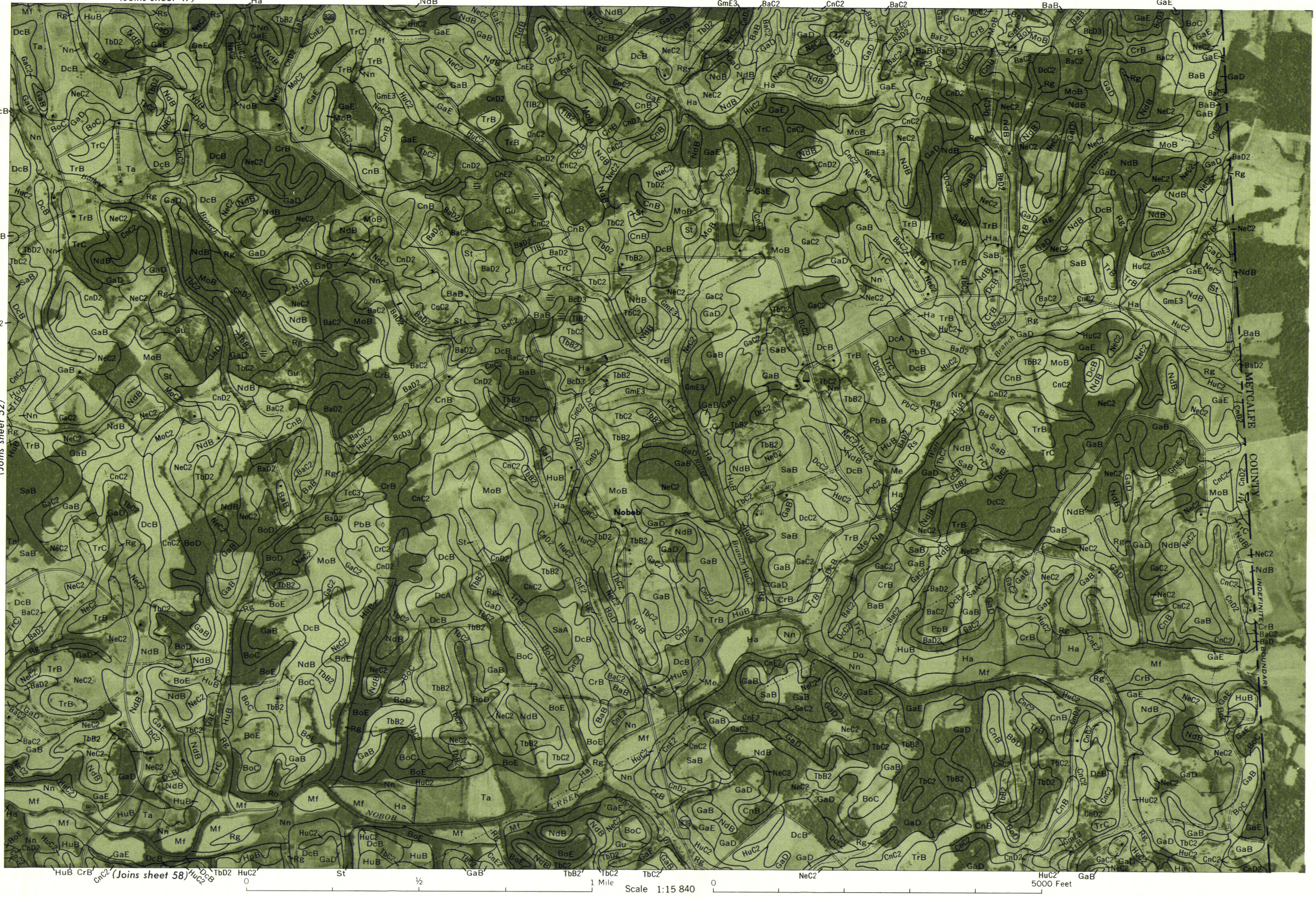
BARREN COUNTY, KENTUCKY NO. 51



0 ½ 1 Mile
Scale 1:15 840
0 5000 Feet

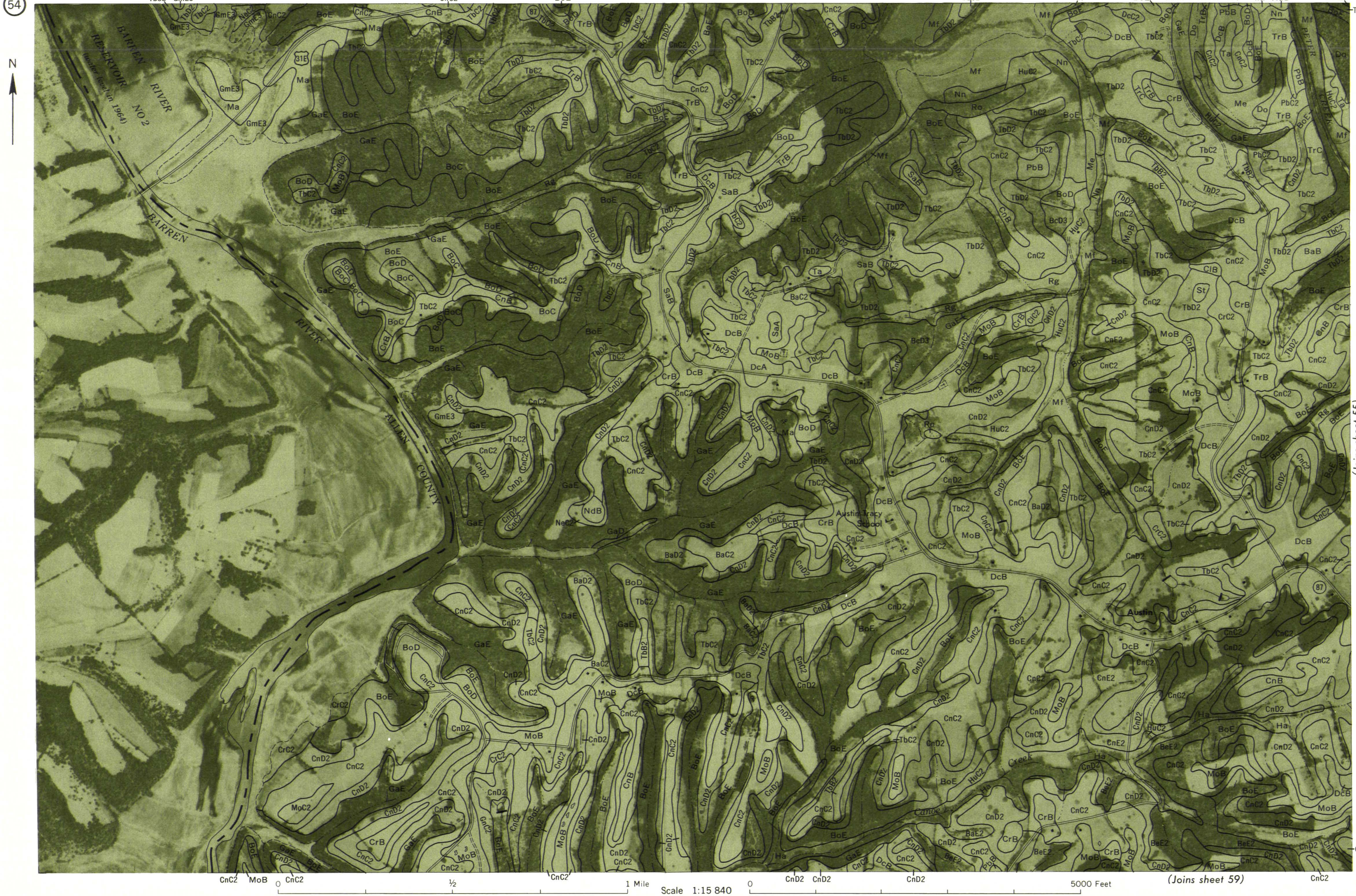
BARREN COUNTY, KENTUCKY NO. 52

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

54



Scale 1:15 840

0 ½ 1 Mile

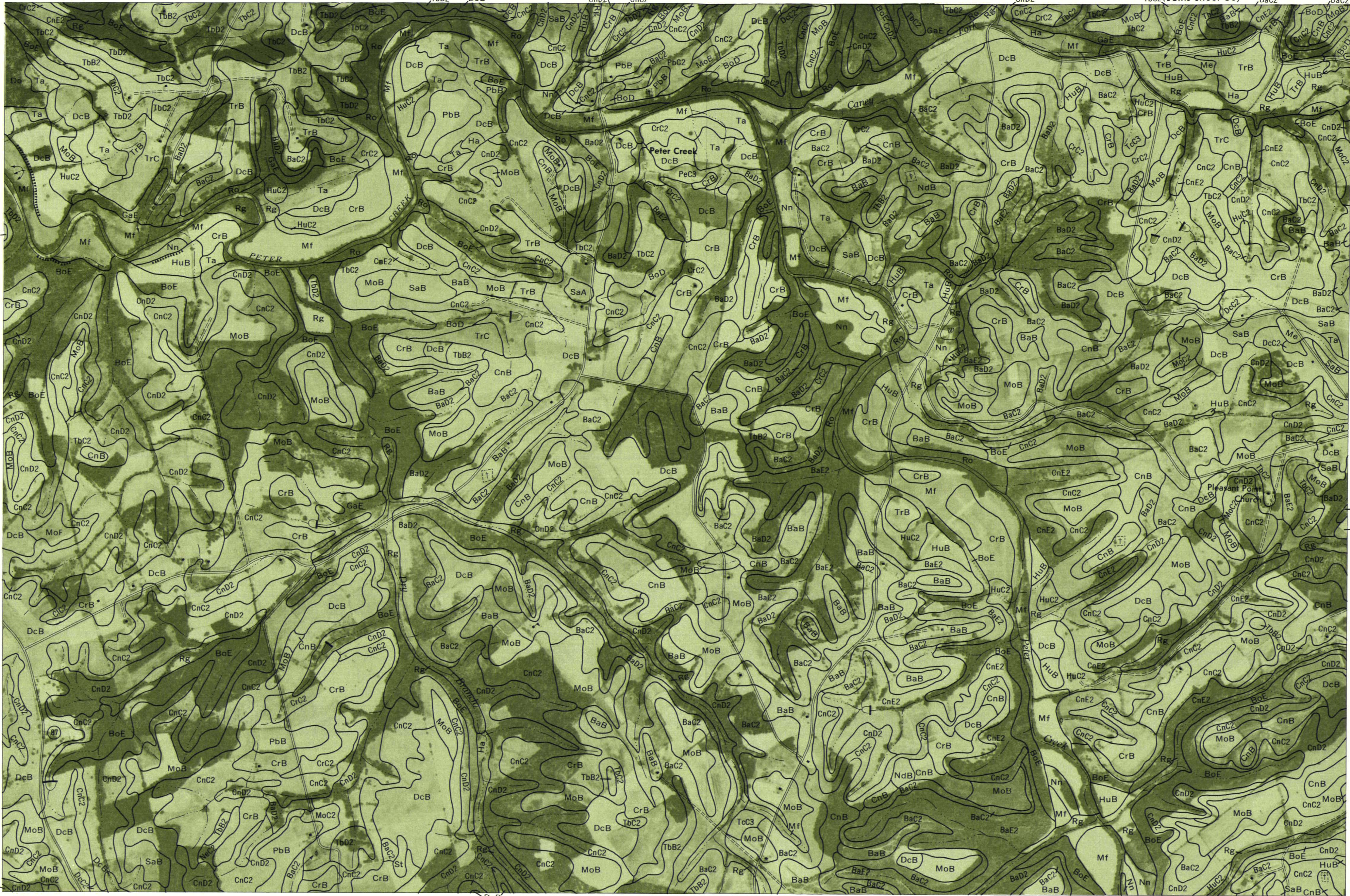
0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 54

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 55

55



BARREN COUNTY, KENTUCKY NO. 55

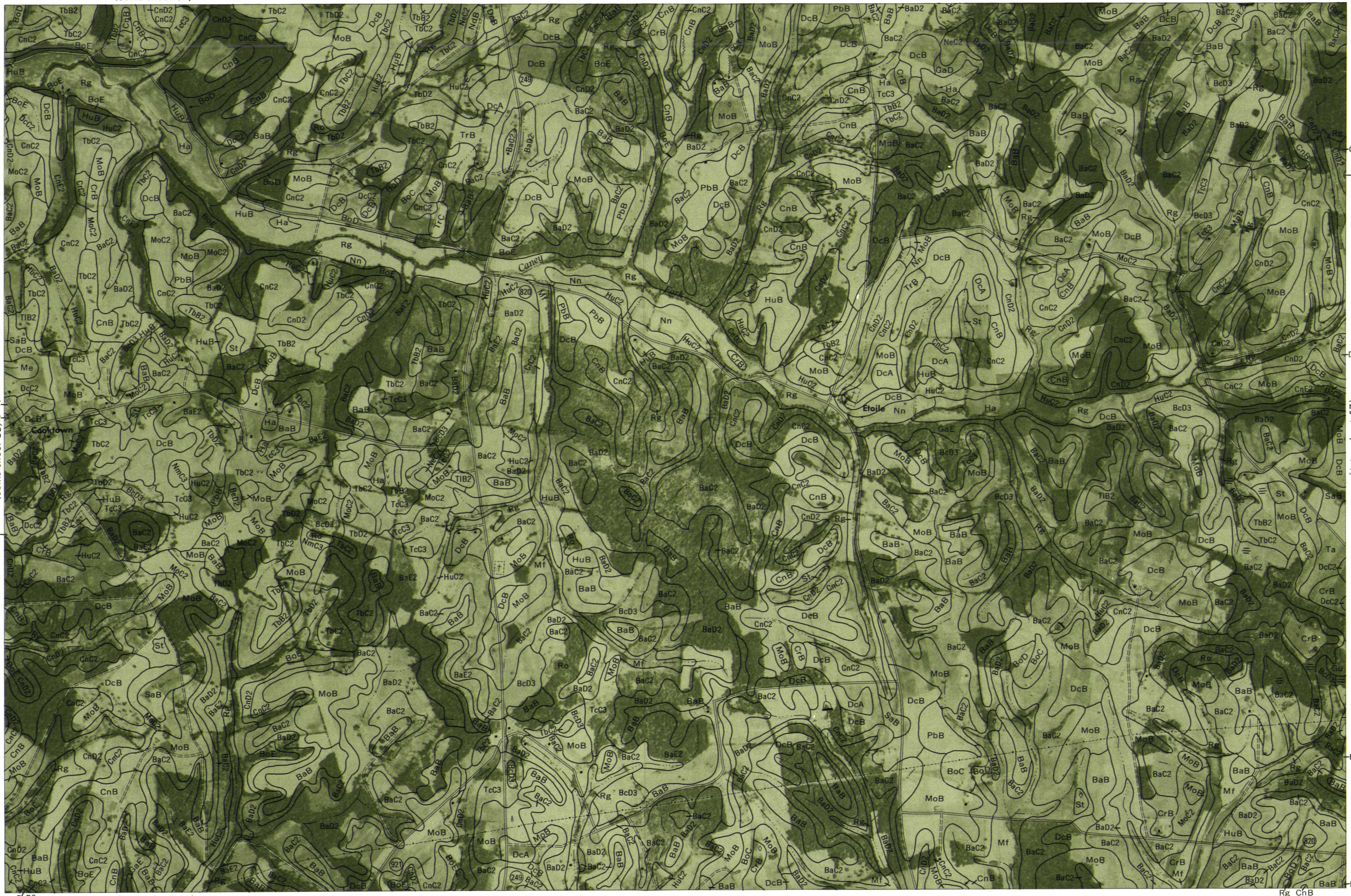
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

56

(Joins sheet 51)

N



(Joins sheet 55)

(Joins sheet 57)

(Joins sheet 61)

Scale 1:15 840

0 ½ 1 Mile

0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 56

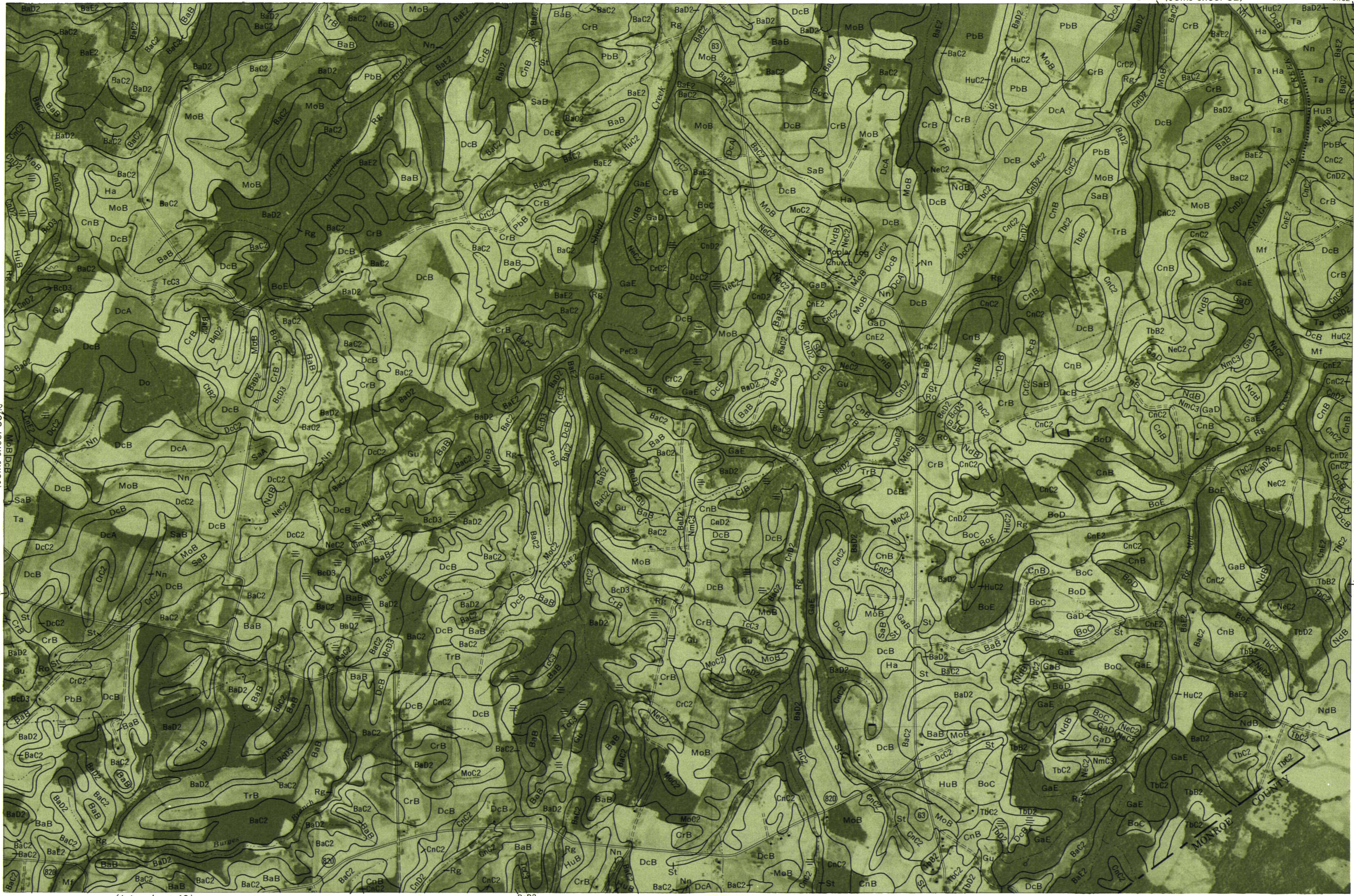
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

57

(Joins sheet 52)

(Joins sheet 56)

(Joins sheet 58)



(Joins sheet 62)

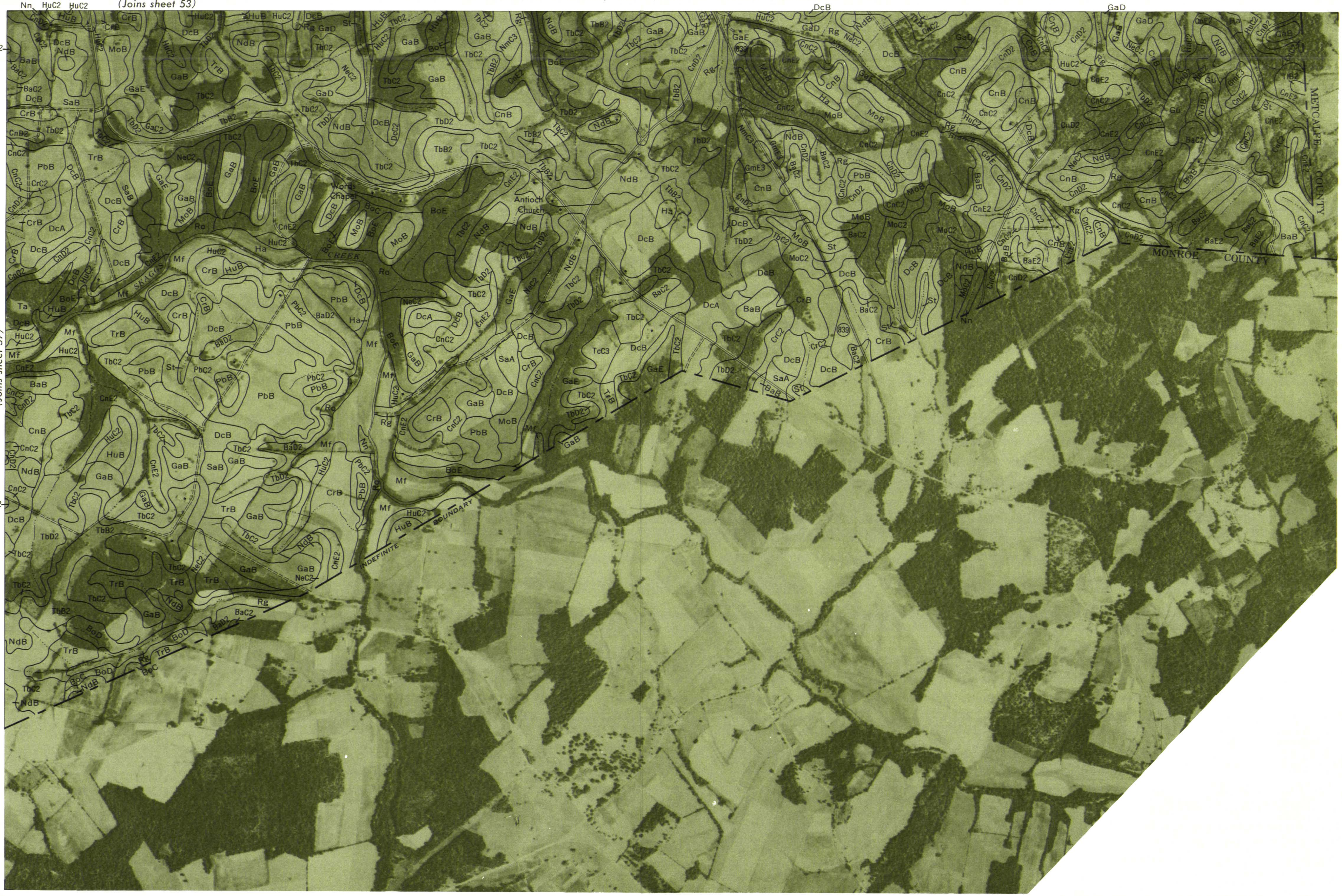
0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

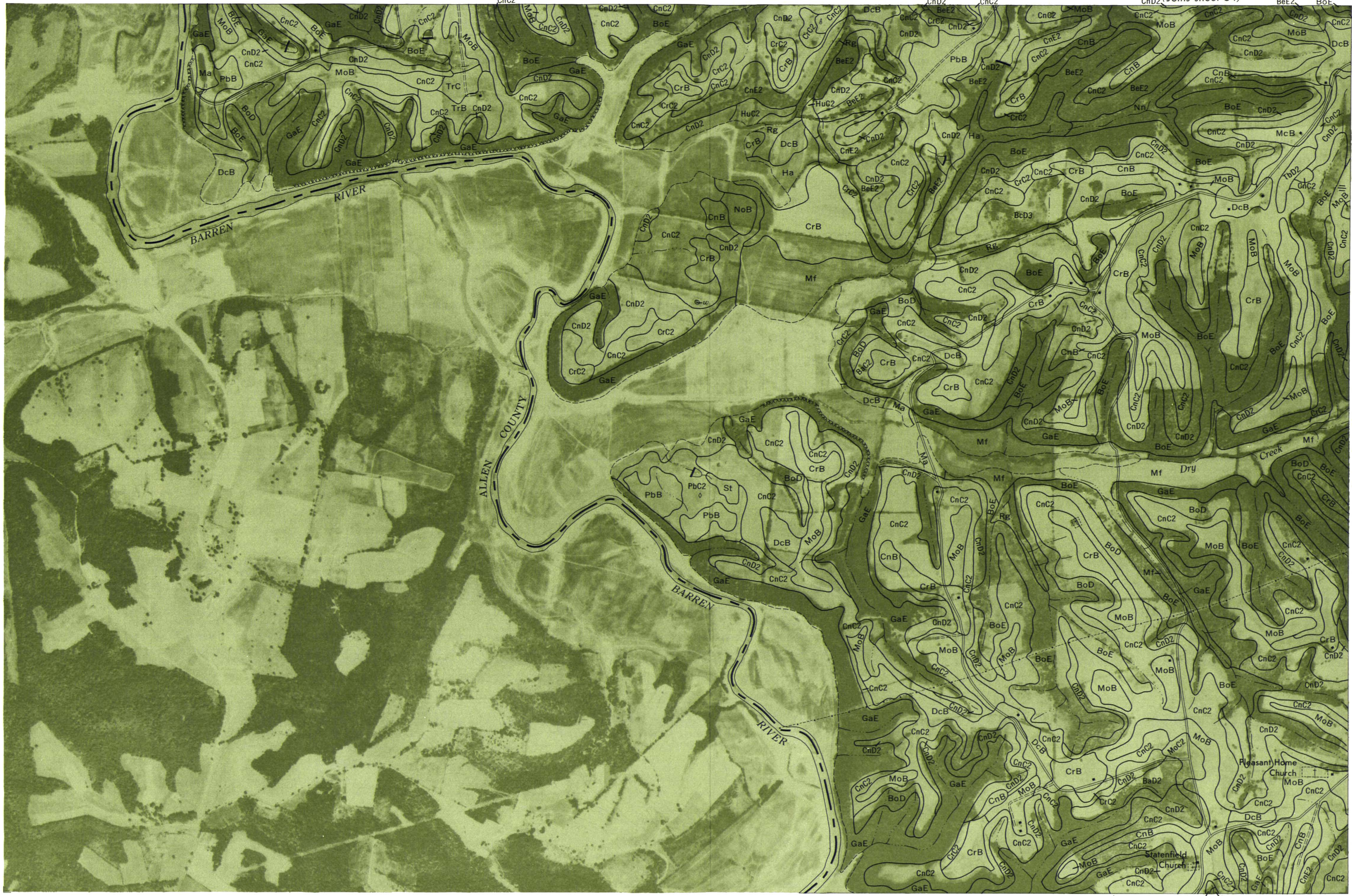
58



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 58

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



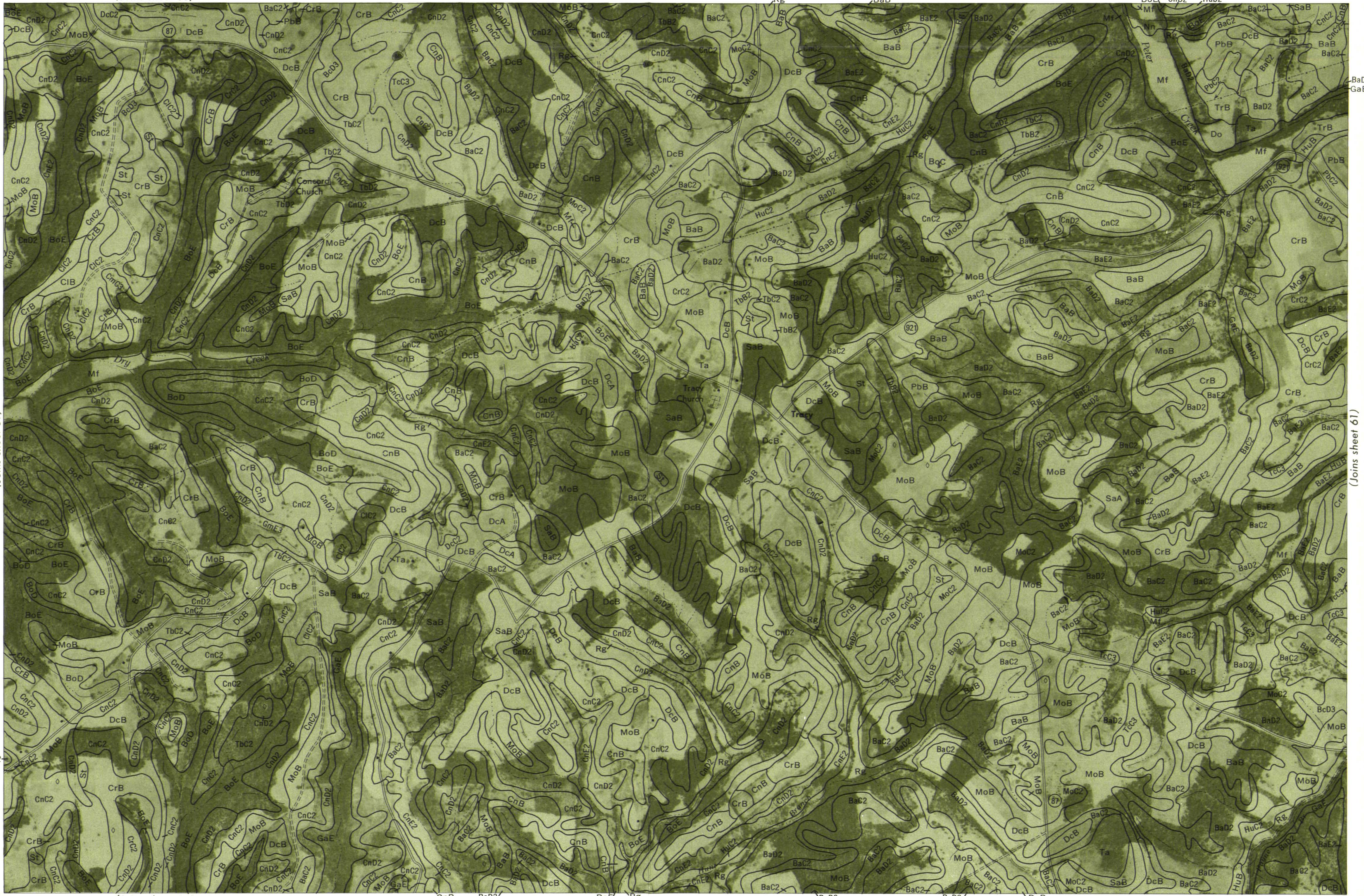
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 60

(Joins sheet 55)

(Joins sheet 59)



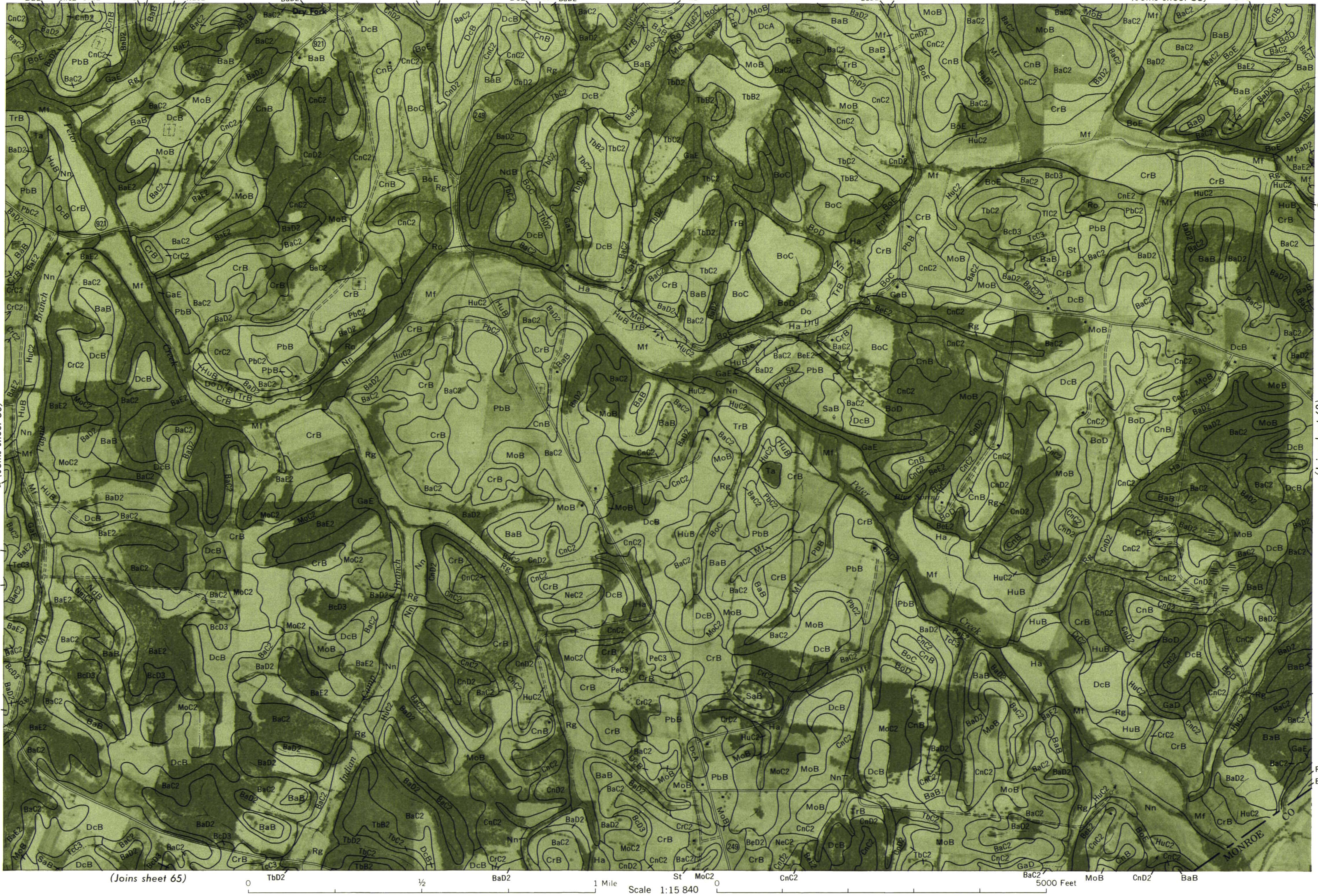
(Joins sheet 61)

(Joins sheet 64)

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 60

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



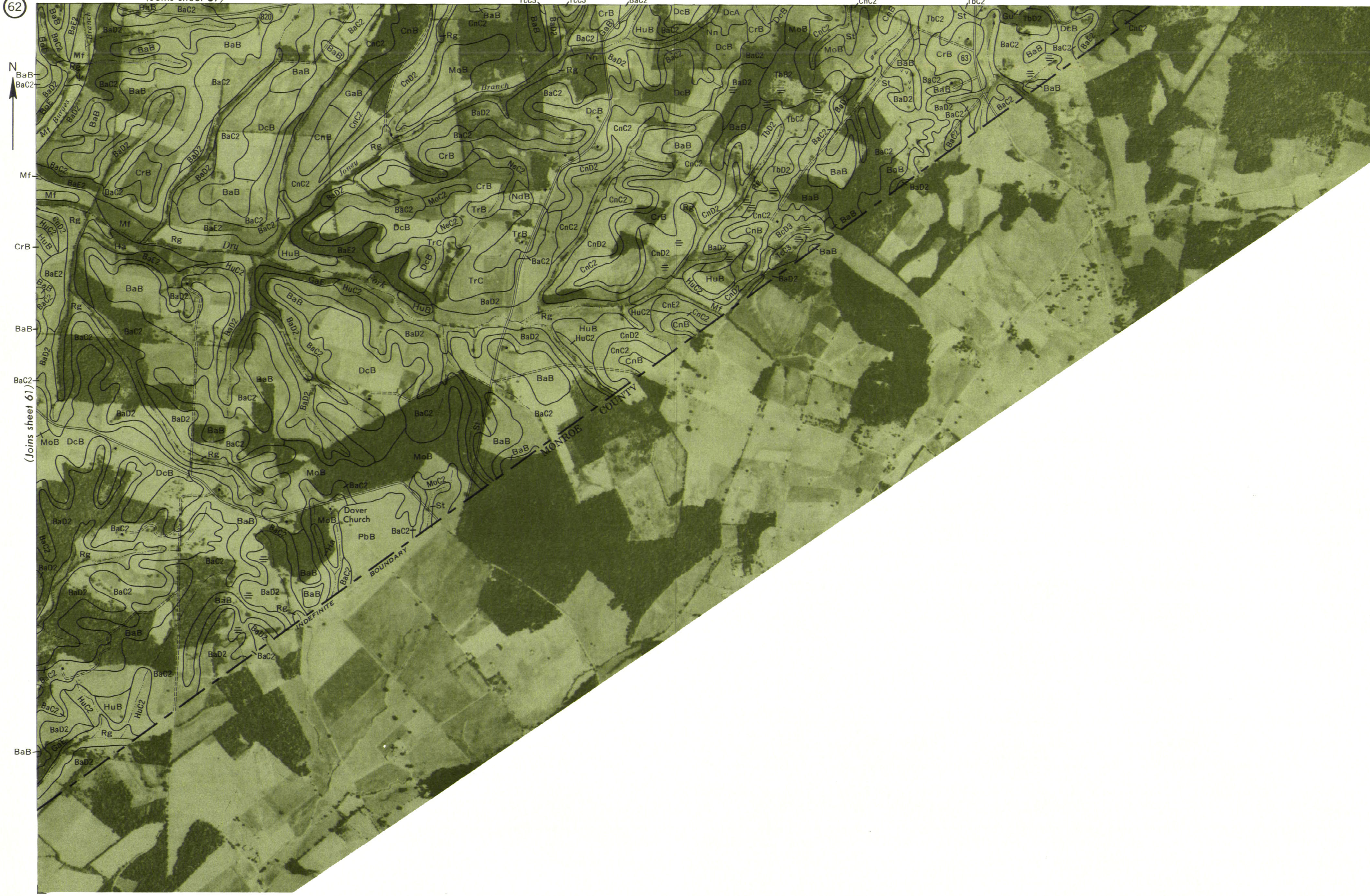
This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 61

BARREN COUNTY, KENTUCKY — SHEET NUMBER 62

(Joins sheet 57)

(Joins sheet 61)



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

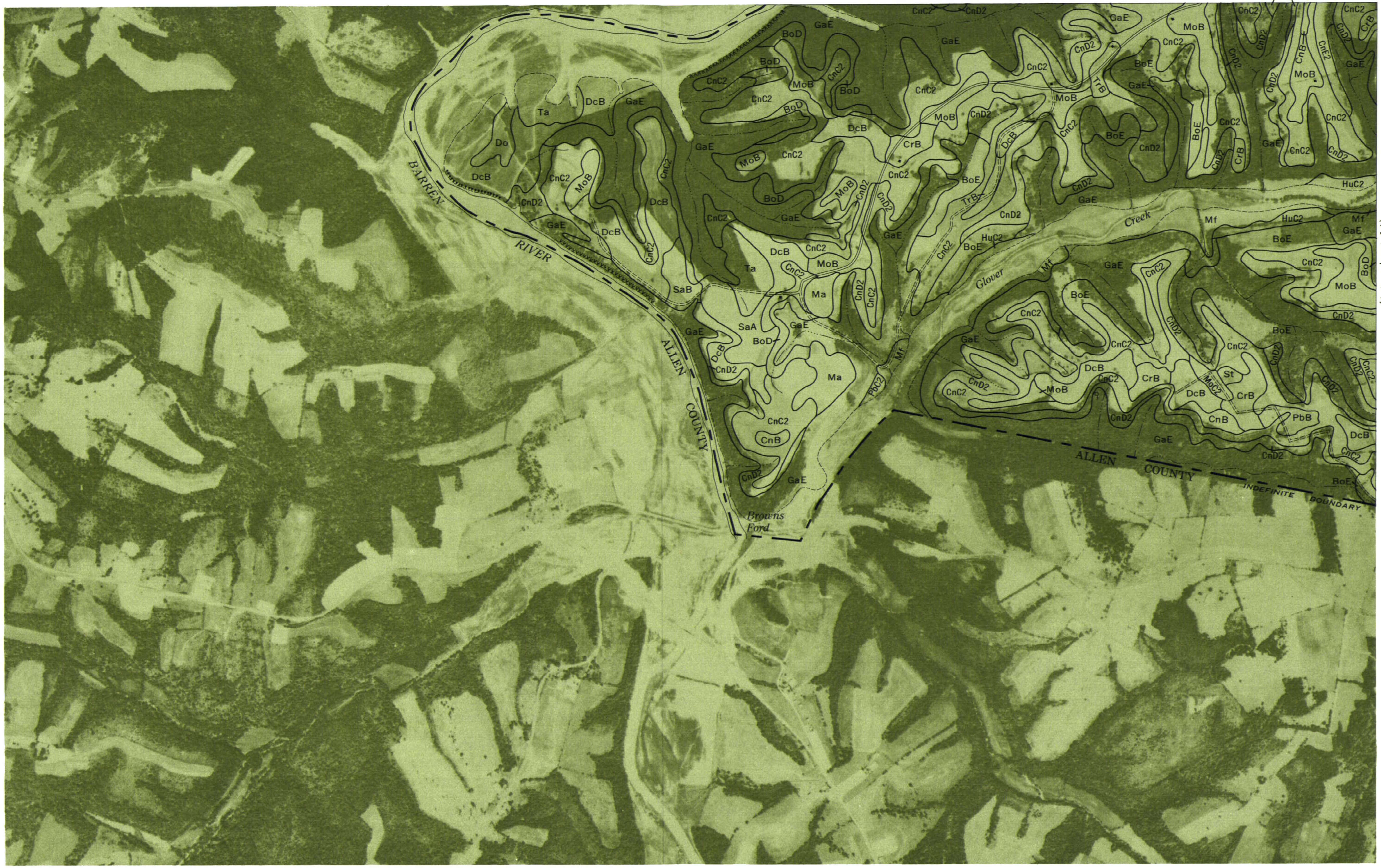
BARREN COUNTY, KENTUCKY NO. 62

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

(Joins sheet 59)

63

N

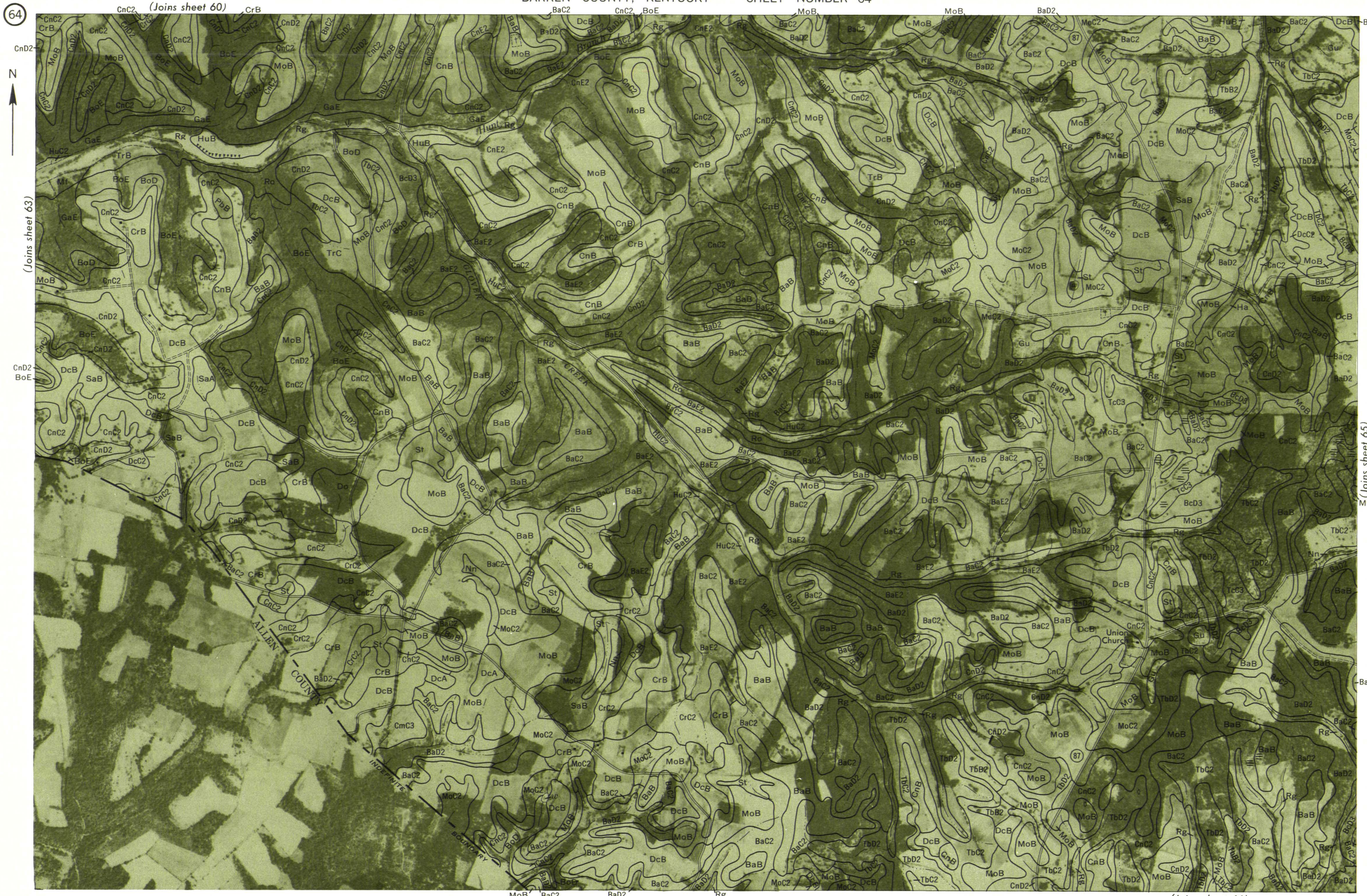


(Joins sheet 64)

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY NO. 63

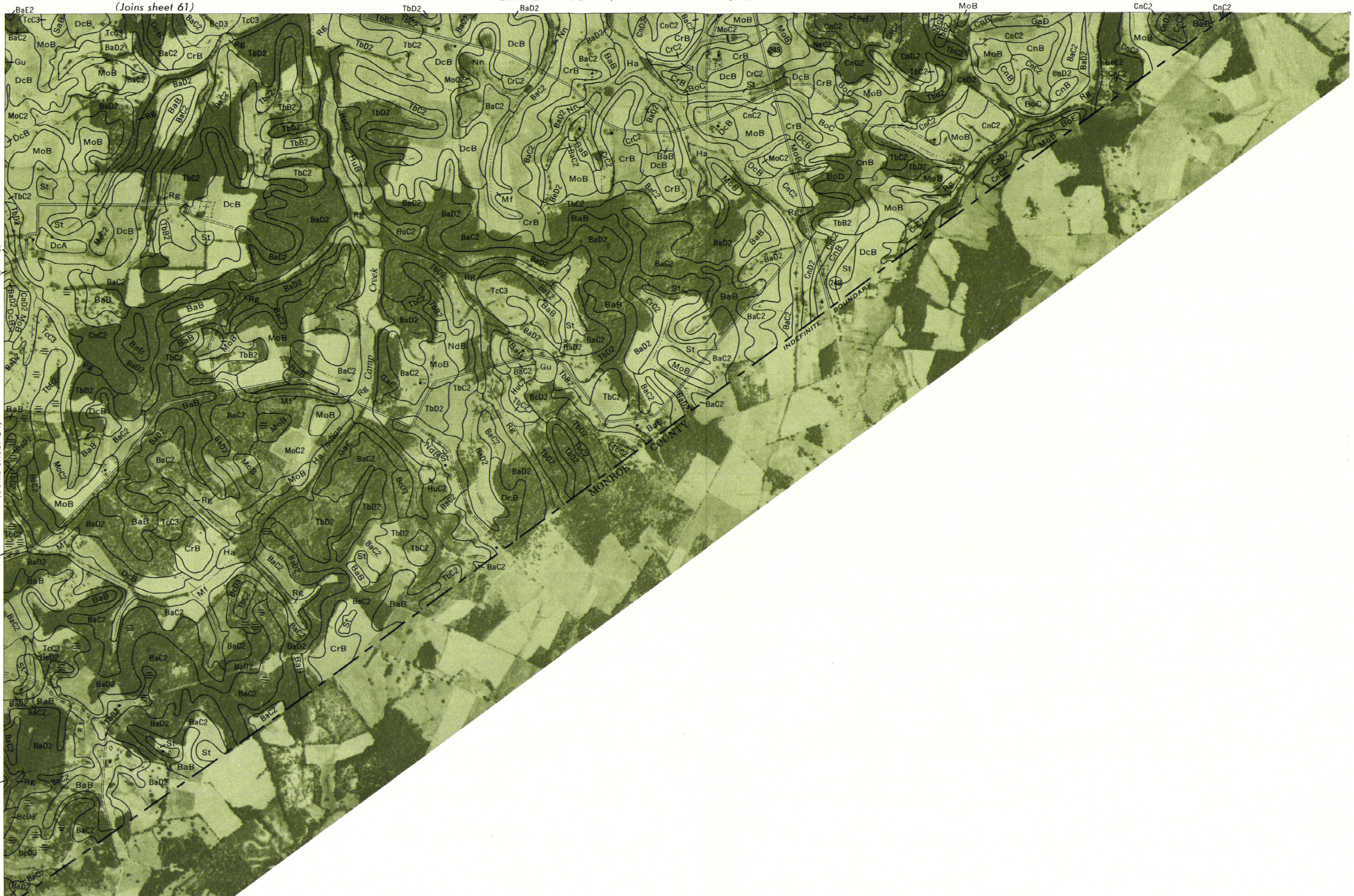
0 ½ 1 Mile Scale 1:15 840 0 5000 Feet



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 64

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.



0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

This map is one of a set compiled in 196 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.

BARREN COUNTY, KENTUCKY — SHEET NUMBER 66

(Joins sheet 64)

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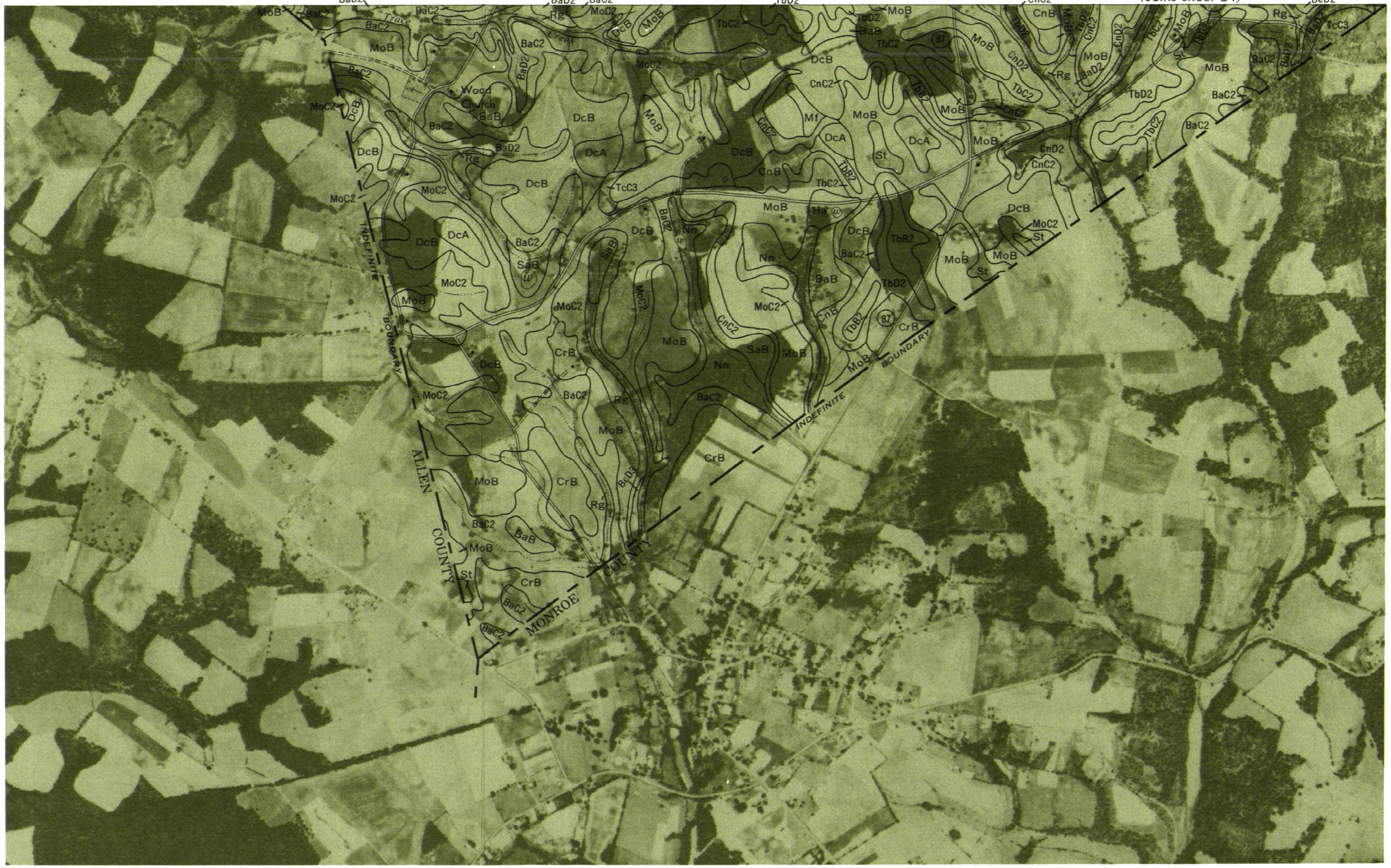

0 ½ 1 Mile Scale 1:15 840 0 5000 Feet

BARREN COUNTY, KENTUCKY NO. 66

This map is one of a set compiled in 1967 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Kentucky Agricultural Experiment Station.